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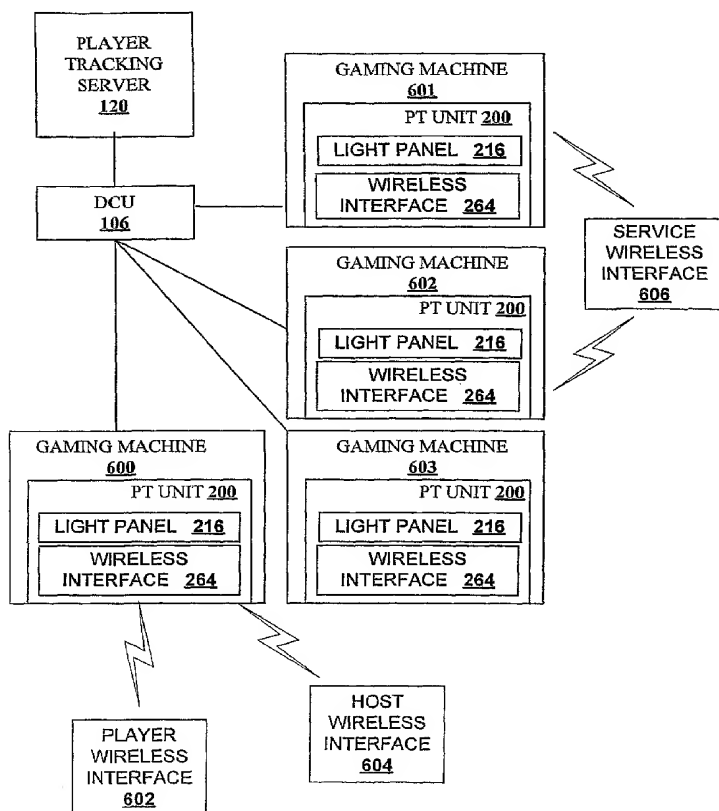
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[Continued on next page]

(54) Title: PLAYER TRACKING COMMUNICATION MECHANISMS IN A GAMING MACHINE



(57) Abstract: A disclosed player tracking unit provides a display and a player tracking controller designed or configured to provide a web-browser on the display. The player tracking unit may include one or more input devices that can receive selections associated with the web-browser. Furthermore, the player tracking unit can include a multimedia board for processing digitally formatted program files for output on the display.

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PLAYER TRACKING COMMUNICATION MECHANISMS IN A GAMING MACHINE

BACKGROUND OF THE INVENTION

5 **[0001]** This invention relates to game playing methods for gaming machines such as video slot machines and video poker machines. More particularly, the present invention relates to methods and apparatus for providing player tracking services on a gaming machine.

10 **[0002]** There are a wide variety of associated devices that can be connected to a gaming machine such as a slot machine or video poker machine. Some examples of these devices are player tracking units, lights, ticket printers, card readers, speakers, bill validators, ticket readers, coin acceptors, display panels, key pads, coin hoppers and button pads. Many of these devices are built into the gaming machine or components associated with the gaming machine such as a top box which usually sits on top of the gaming machine.

15 **[0003]** Typically, utilizing a master gaming controller, the gaming machine controls various combinations of devices that allow a player to play a game on the gaming machine and also encourage game play on the gaming machine. For example, a game played on a gaming machine usually requires a player to input money or indicia of credit into the gaming machine, indicate a wager amount, and initiate a game play. These steps require the gaming machine to control input devices, including bill validators and coin acceptors, to accept money into the gaming machine and recognize user inputs from devices, including touch screens and button pads, to determine the wager amount and initiate game play.

25 **[0004]** After game play has been initiated, the gaming machine determines a game outcome, presents the game outcome to the player and may dispense an award of some type depending on the outcome of the game. A game outcome presentation may utilize many different visual and audio components such as flashing lights, music, sounds and graphics. The visual and audio components of the game outcome presentation may be used to draw a players attention to various game features and to
30 heighten the players interest in additional game play. Maintaining a game player's

interest in game play, such as on a gaming machine or during other gaming activities, is an important consideration for an operator of a gaming establishment.

[0005] One related method of gaining and maintaining a game player's interest in game play are player tracking programs which are offered at various casinos. Player tracking programs provide rewards to players that typically correspond to the player's level of patronage (e.g., to the player's playing frequency and/or total amount of game plays at a given casino). Player tracking rewards may be free meals, free lodging and/or free entertainment. These rewards may help to sustain a game player's interest in additional game play during a visit to a gaming establishment and may entice a player to visit a gaming establishment to partake in various gaming activities.

[0006] In general, player tracking programs may be applied to any game of chance offered at a gaming establishment. In particular, player tracking programs are very popular with players of mechanical slot gaming machines and video slot gaming machines. In a gaming machine, a player tracking program is implemented using a player tracking unit installed in the gaming machine and in communication with a remote player tracking server. Player tracking units are usually manufactured as an after-market device separate from the gaming machine. Many different companies manufacture player tracking units as part of player tracking/accounting systems. These player tracking/accounting systems are used in most casinos. Most casinos utilize only one type of player tracking system (i.e. from one manufacturer) while the type of player tracking system varies from casino to casino.

[0007] An example of a hardware and/or software implementation of a player tracking system with respect to a number of gaming machines is described as follows. FIG. 1 is a block diagram of a number of gaming machines with player tracking units connected to servers providing player tracking services. In casino 150, gaming machines 100, 101, 102 and 103 are connected, via the data collection unit (DCU) 106 to the player tracking/accounting server 120. The DCU 106, which may be connected to up to 32 player tracking units as part of a local network in a particular example, consolidates the information gathered from player tracking units in gaming machines 100, 101, 102 and 103 and forwards the information to the player tracking account server 120. The player tracking account server is designed 1) to store player tracking account information, such as information regarding a player's previous game

play, and 2) to calculate player tracking points based on a player's game play that may be used as basis for providing rewards to the player.

5 [0008] In gaming machine 100 of casino 150, a player tracking unit 107 and slot machine interface board (SMIB) 105 are mounted within a main cabinet 8 of the gaming machine. A top box 6 is mounted on top of the main cabinet 8 of the gaming machine. In many types of gaming machines, the player tracking unit is mounted within the top box 6. Usually, player tracking units, such as 107, and SMIBs, such as 105, are manufactured as separate units before installation into a gaming machine, such as 100.

10 [0009] The player tracking unit 107 includes three player tracking devices, a card reader 24, a key pad 22, and a display 16, all mounted within the unit. The player tracking devices are used to input player tracking information that is needed to implement the player tracking program. The player tracking devices may be mounted in many different arrangements depending upon design constraints such as
15 accessibility to the player, packaging constraints of a gaming machine and a configuration of a gaming machine. For instance, the player tracking devices may be mounted flush with a vertical surface in an upright gaming machine and may be mounted flush or at a slight angle upward with a horizontal in a flat top gaming machine.

20 [0010] The player tracking unit 107 communicates with the player tracking server via the SMIB 105, a main communication board 110 and the data collection unit 106. The SMIB 105 allows the player tracking unit 107 to gather information from the gaming machine 100 such as an amount a player has wagered during a game play session. This information may be used by the player tracking server 120 to calculate
25 player tracking points for the player. The player tracking unit 107 is usually connected to the master gaming controller 104 via a serial connection using a wire serial connector and communicates with the master gaming controller 104 using a serial communication protocol. The serial connection between the SMIB 105 and the master gaming controller 104 may be through the main communication board 110, through
30 another intermediate device or through a direct connection to the master gaming controller 104. In general, communication between the various gaming devices is provided using wire connectors with proprietary communication protocols. As an example of a proprietary serial communication protocol, the master gaming controller

104 may employ a subset of the Slot Accounting System (SAS protocol) developed by International Game Technology of Reno, NV to communicate with the player tracking unit 107.

5 [0011] Typically, when a game player wants to play a game on a gaming machine and utilize the player tracking services available through the player tracking unit, a game player inserts a player tracking card, such as a magnetic striped card, into the card reader 24. After the magnetic striped card has been so inserted, the player tracking unit 107 may detect this event and receive certain identification information contained on the card. For example, a player's name, address, and player tracking
10 account number encoded on the magnetic striped card, may be received by the player tracking unit 107. In general, a player must provide identification information of some type to utilize player tracking services available on a gaming machine. For current player tracking programs, the most common approach for providing identification information is to issue a magnetic-striped card storing the necessary
15 identification information to each player that wishes to participate in a given player tracking program.

[0012] After a player has inserted her or his player tracking card into the card reader 24, the player tracking unit 107 may command the display 16 to display the game player's name on the display 16 and also, may optionally display a message
20 requesting the game player to validate their identity by entering an identification code using the key pad 22. Once the game player's identity has been validated, the player tracking information is relayed to the player tracking server 120. Typically, the player tracking server 120 stores player tracking account records including the number of player tracking points previously accumulated by the player.

25 [0013] During game play on the gaming machine, the player tracking unit 107 may poll the master gaming controller 104 for game play information such as how much money the player has wagered on each game, the time when each game was initiated and the location of the gaming machine. The game play information is sent by the player tracking unit 107 to the player tracking server 120. While a player
30 tracking card is inserted in the card reader 24, the player tracking server 120 may use the game play information provided by the player tracking unit 107 to generate player tracking points and add the points to a player tracking account identified by the player

tracking card. The player tracking points generated by the player tracking server 120 are stored in a memory of some type on the player tracking server.

[0014] As suggested above, a player's incentive for using the player tracking services is awards provided by the gaming machine operator (e.g., the casino). Some incentives of a casino for providing player tracking services is to generate "brand" loyalty, gather valuable information that may be used for marketing and provide better customer services. Unfortunately, when player tracking identification information is not provided to the player tracking server 120 via the player tracking unit 107, player tracking points are not accrued for a game player participating in a game play session on gaming machine 100. For example, when a player tracking card is not inserted into the card reader 24, the player tracking card has been inserted incorrectly or the card reader is malfunctioning, or the game player does not have a player tracking card, a game player may not obtain player tracking points while participating in game play on gaming machine 100. This happens more frequently than one might imagine and may be discouraging to the player.

[0015] Player tracking cards and player tracking programs are becoming more and more popular. They have become a de facto marketing method of doing business at casinos. The programs allow a casino to identify and reward customers based upon their previous game play history. In particular, a goal of the casinos is to identify and then to provide a higher level of service to certain groups of players identified as especially valuable to the casinos. For instance, players that visit the casino, on average, once a week may be deemed as "special" customers and the casino may desire to cultivate a "special" relationship with these customers. One disadvantage of the current player tracking programs is that content displayed through the player tracking devices, such as advertisements, and the like, is typically static information. The information is typically accessible from memory on the gaming machine where the player tracking device is located. Each time a gaming establishment wishes to update the content, each of the gaming machines must be updated, which can be time consuming and costly. Accordingly, it would be desirable to provide apparatus and methods for providing content to gaming machines and player tracking devices more efficiently.

SUMMARY OF THE INVENTION

[0016] This invention addresses the needs indicated above by providing a player tracking unit with a web-browser configured to display web content on a display.

5 [0017] According to one aspect, a player tracking unit is disclosed. The player tracking unit includes a display; a player tracking controller designed or configured to provide a web-browser on the display, wherein the web-browser is configured to display web pages on the display; one or more input devices configured to receive selections associated with the web-browser; and a multimedia board for processing digitally formatted program files for output on the display.

10 [0018] In particular embodiments, the player tracking unit may further comprise an access filter, wherein the access filter is configured to limit access to certain web content to specified players. The access filter may be configured to limit access based on player identification number, status, or both identification number and status. In addition, the player tracking unit may further comprise a jurisdictional filter
15 configured to limit access to particular content in various jurisdictions where the jurisdictional filter is configured to deny access to gaming content that is not permitted in the jurisdiction where the player tracking unit is located. The jurisdiction filter may be configured to deny access to gaming content based upon jurisdictional limits on bet amounts.

20 [0019] In yet other embodiments, the multimedia board may include transcoding capabilities configured to adapt multimedia content, including video and audio content that is configured for a first gaming device with first processing, first storage and first output capabilities, to a second gaming device with second processing, second storage and second output capabilities for the multimedia content. The second
25 output capabilities of the second gaming device may depend on properties of video or audio output devices coupled to the second gaming device. The first gaming device or the second gaming device may be one or more of the gaming machine, the player tracking unit or a portable gaming device.

30 [0020] The player tracking unit may be further designed or configured to send transcoded multimedia content to a remote gaming device. Further, where prior to sending the transcoded multimedia content to the remote gaming device, the player tracking unit may be operable to determine one or more of the processing, storage and output capabilities of the remote gaming device for use in transcoding the multimedia

content. The display on the player tracking unit may provide less resolution than a main display used to present the game of chance on the gaming machine where the transcode capabilities allow video gaming content configured for a first resolution of the main display to be scaled to a second resolution of the display. The gaming
5 content may be a game of chance or a bonus game available for play on the gaming machine. Further, the display on the player tracking unit may provide less resolution than a main display used to present the game of chance on the gaming machine where the transcode capabilities allow gaming content configured for a first resolution of the display to be scaled to a second resolution of the main display.

10 **[0021]** In additional embodiments, the player tracking unit may further comprise: a non-volatile memory for storing critical information. The player tracking controller may be further designed or configured to detect a tilt event on the player tracking unit and store the critical information to the non-volatile memory before the critical
15 information is where the tilt event may be a loss of power. The critical information may be one or more of a snap shot of a web page displayed on the display, a video image displayed on the display, game content displayed on the display, transactional information displayed on the display or combinations thereof or the critical information may be from a game, a bonus game or a transaction generated on the player tracking unit.

20 **[0022]** The player tracking controller is designed or configured to determine the critical information to store in the non-volatile memory and to retrieve a selected portion of the critical information from the non-volatile memory and to display the selected portion of the critical information on the display or send the selected portion of the critical information to a remote gaming device. In addition, the player tracking
25 unit may be further designed or configured to generate an interface on the display for selecting critical information stored in the non-volatile for retrieval.

[0023] The player tracking unit may be further designed or configured to reconstruct a video image from a previous state of the player tracking unit displayed on the display using the critical information stored on the gaming machine. The
30 reconstructed video image may be from a game, a bonus game or a transaction interface generated on the player tracking unit. Further, the player tracking unit may be designed or configured to store a video image from a previous state of the player

tracking unit to the non-volatile memory. The video image may be from a game, a bonus game or a transaction interface generated on the player tracking unit.

5 [0024] In another embodiment, during operation of player tracking unit, the player tracking controller may advance between a plurality of states and stores the state information for each of the plurality of states to the non-volatile memory and where when a malfunction occurs between a first state and a second state in the plurality of states the player tracking unit is operable to restore itself to the first state using the state information for the first state stored in the non-volatile memory.

10 [0025] Another aspect of the present invention provides a player tracking unit. The player tracking unit may be generally characterized as comprising: 1) a display; 2) a player tracking controller designed or configured to a) to track wagering activity on a gaming machine providing wagering on a game of chance and b) advance between a plurality of states and stores the state information for each of the plurality of states to a non-volatile memory where when a malfunction occurs between a first
15 state and a second state in the plurality of states the player tracking unit is operable to restore itself to the first state using the state information for the first state stored in the non-volatile memory; 3) one or more input devices configured to receive selections associated with interfaces displayed on the display; 4) a communication board for communicating with remote gaming devices; and 5) the non-volatile memory for
20 storing the state information. The state information may be from a game, a bonus game or a transaction interface generated on the player tracking unit.

[0026] Another aspect relates to a gaming machine that includes a master gaming controller designed or configured to present one or more games of chance played on the gaming machine and a player tracking unit. The player tracking unit includes a
25 display; a player tracking controller designed or configured to provide a web-browser on the display, wherein the web-browser is configured to display web pages on the display; one or more input devices configured to receive selections associated with the web-browser; and a multimedia board for processing digitally formatted program files for output on the display.

30 [0027] Yet another aspect relates to a player tracking system that includes one or more remote servers and a plurality of gaming machines. The gaming machines each include a master gaming controller designed or configured to control one or more games of chance played on the gaming machine and a player tracking unit. The

player tracking unit includes a display; a player tracking controller designed or configured to provide a web-browser on the display, wherein the web-browser is configured to display web pages on the display; one or more input devices configured to receive selections associated with the web-browser; and a multimedia board for
5 processing digitally formatted program files for output on the display. The player tracking system further includes a network designed or configured to allow communication between the plurality of gaming machines, the player tracking units on the gaming machines, and the one or more remote servers.

[0028] Another aspect of the invention pertains to computer program products
10 including a machine-readable medium on which are stored program instructions for implementing any of the methods described above. Any of the methods of this invention may be represented as program instructions and/or data structures, databases, etc. that can be provided on such computer readable media.

[0029] These and other features and advantages of the invention will be spelled
15 out in more detail below with reference to the associated drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] FIGURE 1 is a block diagram of a number of gaming machines with player tracking units connected to servers providing player tracking services for one embodiment of the present invention.

20 [0031] FIGURES 2A and 2C are perspective diagrams of embodiments of player tracking units of the present invention.

[0032] FIGURE 2B is a mounting system for attaching an interface peripheral used as a player tracking device to a player tracking unit for one embodiment of the present invention.

25 [0033] FIGURE 3 is a block diagram of the components of a player tracking unit for one embodiment of the present invention.

[0034] FIGURE 4 is a perspective drawing of a video gaming machine for one embodiment of the present invention.

[0035] FIGURE 5 is a block diagram of a number of gaming machines each with
30 a player tracking unit connected in a player tracking system where the player tracking

units use illumination devices and wireless interface devices to convey gaming information for one embodiment of the present invention.

[0036] FIGURE 6 is a flow chart of a method for visually providing gaming information on a gaming machine for one embodiment of the present invention.

5 [0037] FIGURE 7 is a block diagram of a player tracking network for one embodiment of the present invention.

[0038] FIGURE 8 is a block diagram of a player tracking user interface for one embodiment of the present invention.

10 [0039] FIGURE 9 is a block diagram of a multimedia board for a player tracking unit for one embodiment of the present invention.

[0040] FIGURE 10 is a block diagram of components of a player tracking unit for one embodiment of the present invention.

[0041] FIGURE 11 is a block diagram of a software architecture for a player tracking unit for one embodiment of the present invention.

15 [0042] FIGURE 12 is a flow chart of a method of registering a gaming machine with a player tracking unit to one or more servers in communication with the player tracking unit for one embodiment of the present invention.

20 [0043] FIGURE 13 is a flow chart of a method of deregistering a gaming machine with a player tracking unit to one or more servers in communication with the player tracking unit for one embodiment of the present invention.

[0044] FIGURE 14 is a block diagram of a gaming system that provides access to Web content from a player tracking unit for one embodiment of the present invention.

[0045] FIGURE 15A is a block diagram of a gaming machine with a network connection for one embodiment of the present invention.

25 [0046] FIGURE 15B is a block diagram of a player tracking unit with a Web browser for one embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

30 [0047] As described above in the Background section, providing content to each of the gaming machines in a gaming establishment can be time-consuming and costly. Accordingly, various embodiments of the present invention provide player tracking

units with web-browsers configured to provide web content through a display on the player tracking unit. By providing access to Web content from a player tracking unit, content providers, such as gaming establishments having a web site, etc., can provide static or dynamic content efficiently at one web site. The web site can be accessed by
5 Internet users, gaming machine players, etc. If changes are made to the web site, all of these users will receive the updated information without the content provider needing to update various channels of communication, thereby reducing the amount of time and expense associated with updating content.

[0048] FIGURES. 2A and 2C are perspective diagrams of different embodiments of player tracking units of the present invention. FIGURE. 2B is a mounting system for attaching a player tracking device to a player tracking unit of the present invention. FIG. 2A is a front diagram for a housing or chassis 200 enclosing a number of interface peripherals. The interface peripherals may be used to provide input and output (I/O) to a player tracking system or may be used to provide I/O to other gaming
10 systems such as a gaming machine. The device housing 200 may enclose a logic device (not shown) and other electronics configured to execute player tracking functions or the logic device may be enclosed in a logic device housing separate from the device housing 200.
15

[0049] Using the player tracking interface devices enclosed in the housing 200, gaming information, such as player tracking information, may be input to the player tracking unit and gaming information may be visually and aurally communicated to various individuals that may use the player tracking unit, such as game players, casino service representatives and maintenance technicians. Aspects of the present invention involve using illumination devices, such as back lit key pad buttons (e.g. 221, 222 and
20 223), light 211 and light 216 and sound projection devices, such as speaker 209, to visually and/or aurally communicate game information. The function buttons, F1, F2, F3 and F4 (i.e. 221) may be used to provide various services through the player tracking unit. Thus, in the following paragraphs, player tracking device hardware, its integration into the device housing 200 and methods for visually and aurally
25 communicating gaming information using the hardware devices, are described.
30

[0050] The device housing 200 encloses a display 215, a key pad 220, a microphone 207, a speaker 209, a card reader 225, a light 216 adjacent to the card reader 225 and a light 216 adjacent to the display 215. In other embodiments, the

housing 200 may enclose many different combinations of player tracking interface devices. For instance, additional gaming devices, such as biometric input devices, wireless interface devices cameras and bonus buttons, may also be enclosed in the device housing (see FIG. 2C). In one embodiment, face plate 230 surrounds the display 215, the key pad 220, the card reader 225, the light 216, the light 211, the microphone 207 and the speaker 209. The face plate 230 may include mounting holes, such as 212, for mounting various player tracking interface devices to the face plate 230 such as the display 215 (see FIG. 2B).

[0051] The face plate 230 includes cut-outs (not shown) that may allow access to the player tracking interface devices. For instance, a front portion of the light 216, a front portion of the display 215, and a front portion of the key pad are visible through the face plate 230. Each of the key pad buttons, such as 221, 222 and 223, may be back-lit by illumination devices of some type. The illumination devices, behind the key pad buttons, may be independently controlled to display various light and color patterns. The light and color patterns may be used to represent game information. Details of a back-lit key pad used to convey gaming information are described in co-pending U.S. application number 09/476,143, filed January 3, 2000, by Powell et al., entitled, "A MICROCONTROLLED BACKLIT KEYPAD ASSEMBLY AND METHOD FOR A GAMING MACHINE" which is incorporated herein in its entirety and for all purposes.

[0052] The dimensions of the device housing 200, (e.g. 205, 208 and 210) are shown in FIGs. 2A and 2C. The device housing 200 is shown as a rectangular box for illustrative purposes only. A shape of the device housing 200 is variable and is not strictly limited to rectangular shapes. Further, dimensions of the cut-outs on the face plate 230 for the player tracking interface devices may vary depending the manufacturer of a particular interface peripheral device which may be used in a player tracking device. Typically, the dimensions of player tracking interface devices vary from manufacturer to manufacturer.

[0053] The light 216, adjacent to the display 215 may use one or more illumination devices. Further, the light 216 may employ one or more types of lighting systems such as light emitting diodes (LED's), neon bulbs, incandescent bulbs, halogen bulbs, florescent bulbs, electro-luminescent lighting elements or combination thereof. In a particular embodiment, the LED's may be multi-colored LED's. Details

of providing electro-luminescent lighting elements to convey gaming information on a player tracking unit are described in co-pending U.S. application 10/139,801, filed May 3, 2002, by Winans, and entitled, "LIGHT EMITTING INTERFACE DISPLAYS FOR A GAMING MACHINE," which is incorporated herein in its entirety and for all purposes.

[0054] The light 216 may include a translucent cover 227 with different segments, such as 218 and 219. The cover 227 and cover segments 218 and 219 may be colored in some manner. For instance, cover segments 218 may be red and cover segment 219 may be blue while the remaining cover may be clear. The cover may be manufactured from a translucent plastic material. The cover segments 218 and 219 may protrude above the surface of face plate 230 to increase visibility of the light 216. The translucent cover may vary in shape. Depending on the lighting system used, the translucent cover may be removable to allow replacement of a defective bulb or other lighting system element.

[0055] The translucent cover 227 with cover segments 218 and 219, may enclose one or more illumination devices. For instance, cover segment 219 may enclose a plurality of LED's while cover segment 218 may enclose a neon bulb. The illumination of each of the illumination devices may be independently controlled by electronics (see FIG. 3) located within the device housing 200. The translucent cover may extend substantially surround the display 215 or the translucent cover may extend around a portion of the perimeter of the display 215 (see FIG. 2C). The display 215 may be an LED, LCD, vacuum florescent, plasma display screen or any other type of display technology.

[0056] The location of the illumination devices within light 216 may be used to indicate different types of gaming information. In one embodiment, illumination devices located below cover segment 219 may be operated in some manner to visually communicate player status information while illumination devices located below cover segment 218 may be used to indicated card status information for a card inserted in the card reader 225. For instance, for an especially valued customer, cover segment 219 may be illuminated in a shade of green while cover segment 218 remains unilluminated. As another example, when a card is inserted incorrectly in the card reader 225, such as the card is inserted up-side down, cover segment 218 may be illuminated with a flashing red pattern while cover segment 219 remains

unilluminated. In some embodiments, depending on the type of gaming information being displayed, two or more illumination devices on light 216 may be illuminated simultaneously where each of the illumination devices is used to convey a different type of gaming information. For instance, a first illumination device may be illuminated in some manner to visually communicate player status information, while a second illumination device may be used to communicate card status information and while a third illumination device may be used to communicate an error condition on the player tracking unit where combinations of two or more of the illumination devices may be illuminated at the same time.

10 **[0057]** FIGs. 2B is a mounting system for attaching a display 215 to a device housing 200 for one embodiment the present invention. Many mounting systems may be used with the present invention and the example in FIG. 2B is provided for illustrative purposes only. The display 215 and LED's, 228 and 229, are attached to the mount 254 which is secured with a decorative plate 252 to a decorative skin 250
15 of polycarbonate plastic material. Typically, the decorative skin 250 is silk-screened to add a particular graphic design. In some embodiments, the LED's or other illumination devices of the present invention may also be secured to the display 215. The cover 227 for the illumination devices 228 and 229 is shown protruding through and above the decorative skin 250. Attachment means are used to secure the display
20 215 to the mount 254 and/or the device housing 200. Attachment means (not shown) are also used to secure the other player tracking interface devices, such as the card reader 225, the key pad 220, the microphone 207 and the speaker 209 to the device housing 300.

[0058] FIG. 2C is a front diagram for a housing or chassis 200 enclosing a
25 number of interface peripherals which may be used as player tracking interface devices, for one embodiment of the present invention. The front plate 230 is covered with a decorative skin 265 with a silk-screen logo 266. In addition to the player tracking interface devices described with respect to FIG. 2A, the player tracking housing 200 includes a wireless interface 264, a camera 262 and a finger-print reader
30 with platen 260.

[0059] The display 215 is a color LCD. Other display technologies such as organic electro-luminescent devices may be used with the display 215. A portion of the LCD 215 may be used at times to visually convey gaming information as

described in regards to light 216. For instance, a border region 261 around the perimeter of the display may flash green to indicate a player has requested a drink. In this embodiment, the light 216 surrounds a top portion of the display 215 and parts of the side of display 215. In another embodiment, the light 216 may be located across
5 the top portion of the display 215.

[0060] The camera 262 may be used for security purposes, promotional purposes and to enter biometric information. For instance, the camera 262 may deter tampering with a player tracking unit or gaming machine. As another example, a picture of a player may be recorded when they win a jackpot and used for a promotion. As another
10 example, the camera may be used with feature recognition software to identify the player. Similarly, the finger-print reader 260 may be used to read a player's fingerprint which is used to determine their identity. As another example, the microphone 207 may be used with voice recognition software to recognize a player's voice for player authentication purposes. Thus, a voice signal input into the
15 microphone 207 may be compared with a stored voice print to identify the player. In some embodiments, biometric input devices may be used to supplement information read from a card inserted in the card reader or to even replace the card reader 225. A description of a finger print reader as an identification device is provided in co-
pending U.S. application no. 09/172,787, filed 10/14/98, by Wells, et al., entitled
20 "Gaming Device Identification method and Apparatus," which is incorporated herein in its entirety and for all purposes.

[0061] The wireless interface 264 may be used to communicate with a portable wireless device worn or carried by a player, a casino service representative or maintenance technician. For example, rather than inserting a card into the card reader
25 225, a player may wear or simply carry a wireless communication device that may be about the size of a player tracking card. When the player is near the machine, a wireless interface device 264 and the wireless device worn by the player may automatically detect each other establish communications allowing gaming information to be transferred between the wireless devices.

30 [0062] As example, the wireless interface device 264 may use a wireless communication standard such as Bluetooth™ to communicate with portable wireless devices using this standard although other wireless communication protocols such as IEEE 802.11a, IEEE 802.11b, IEEE 802.11x (e.g. other IEEE 802.11 standards),

hiperlan/2, and HomeRF may also be used. Bluetooth devices communicate on a frequency of 2.45 Gigahertz. Typically, Bluetooth devices send out signals in the range of 1 milliwatt. The signal strength limits the range of the devices to about 10 meters and also limits potential interference sources. Interference is also limited by
5 using spread-spectrum frequency hopping. For instance, a device may use 79 or more randomly chosen frequencies within a designated range that change on a regular basis up to 1,600 times a second. Thus, even if interference occurs, it is likely only to occur for a short period of time.

[0063] When Bluetooth-capable devices come within range of one another, an
10 electronic conversation takes place to determine whether they have data share or whether one needs to control the other. The connection process is performed automatically. Once a conversation between the devices has occurred, the devices form a network. Bluetooth systems create a Personal-Area Networks (PAN) or “piconets”. While the two or more devices in a piconet remain in range of one
15 another, the distances between the communications devices may vary as the wireless devices are moved about. Once a piconet is established, such as between the wireless interface device 264 and a portable wireless device, the members of the piconet randomly hop frequencies in unison so they remain in touch with another and avoid other piconets that may be operating in proximity to the established piconet. When
20 Bluetooth is applied in a casino environment, many such piconets may be operating simultaneously. Details of the Bluetooth™ standard and the Bluetooth™ special interest group may be found at www.bluetooth.com.

[0064] In another embodiment of the present invention, the microphone 207 and speaker 209 may be used to input gaming information and aurally communicate
25 gaming information. For instance, the microphone 207 may be used with voice recognition software executed by: a) a logic device on the player tracking unit or b) a master gaming controller in a gaming machine, may be used recognize verbal requests for gaming services. For instance, the player may request a drink by saying, “order me a drink” into the microphone 207.

[0065] The speaker 209 may be used to aurally communicate gaming information
30 to the player or someone else using the gaming machine. For instance, when a card has been inserted incorrectly in the card reader 225. A message, such as “card not inserted correctly,” may be projected from the speaker. Simultaneously, although not

required, the light 216 may flash red to draw the player's attention. Voice messages from the speaker 209 may be projected in different languages. For example, for a Japanese speaking game player messages may be in Japanese, for a Spanish speaking game player the messages may be in Spanish while for an English speaking player the messages may be in English. The language preferred by the player may be stored as player tracking information on a player tracking card or the player may be able to specify their language using one of the input devices on the player tracking unit. The player tracking information on the player tracking card may be based on a user profile previously established by the player which may be used to select the language used by the player.

[0066] In general, the same game information may be communicated visually, aurally or both visually and aurally. Further, one type of game information may be communicated only aurally while another type of game information may be communicated only visually. For visual communication of game information, combinations of illumination devices in the light 216, the light 211 and the back-lit key pad buttons (e.g. 221, 222 and 223) may be illuminated in different color and light patterns that may vary with time and may last for only a specific duration. For instance, when the gaming machine has been idle for a specific period time some of the lights (e.g. 216 or 211) on the housing 200 may flash in a pattern for a specific amount of time at specific intervals to attract a player's attention. As another example, an error condition detected in the player tracking unit may result in visual response which remains on until the error condition is cleared by an operator. For aural communication of game information, various sounds and verbal message may be projected from a sound projection device such as the speaker 209. These sounds or messages may vary with time and may last for a specific duration of time.

[0067] The player tracking housing 200 may be installed in a gaming machine. In response to a game event or bonus game event generated from the game played on the gaming machine, the illumination devices may be illuminated and/or a sound may be projected from the sound projection device. The game event or bonus game event may also be generated from a game played on one or more gaming machines in communication with the gaming machine where the player tracking housing 200 is mounted such as gaming machines connected together around a gaming carousel. In addition, the game event may be generated from a remote gaming device such as

player tracking server connected to the gaming machine. For example, all players playing a group of gaming machines (e.g. 25 cent denomination machines) in communication with the remote gaming device may be awarded free credits, free airline miles, or another prize. As another example, in response to a signal generated from a proximity sensor on the player tracking unit, such as an infrared device or a Bluetooth device that is activated when a person is in front of the gaming machine, the illumination devices may be illuminated and/or a sound may be projected from the sound projection device to attract a player's attention.

[0068] In particular embodiments, to indicate a status of a card inserted in the card reader 225, the one or more of the illumination devices may be illuminated and/or a sound, such as a voice message, may be projected from the sound projection device. The card status may be an invalid card, an abandoned card or an incorrectly inserted card. In addition, the one or more illumination devices may be illuminated and/or a sound may be projected from the sound projection device to indicate 1) a special status of a player, 2) to indicate an amount of credits (e.g., 51, 105, 205, etc.), a range of credits (e.g. 0-100, 101-200, 201-300, etc.) or a level (e.g. 1000 points=level 1, 5000 points=level 2 and win a free jacket, 15,000=level 3 and win a free trip; points may be player tracking points or some other point system) earned by the player during a game play session on the gaming machine, 3) to indicate a service request by the player such as a drink request, 4) to indicate a status of a gaming device located on the gaming machine such as a hopper, a drop door or a printer, 5) a status one or more of the player tracking interface devices located on said player tracking unit, 6) a jackpot is pending and requires a "hand" payout, 7) an error condition has been detected on the gaming machine or the player tracking unit and 8) a special promotion is being offered at a gaming establishment where the player tracking unit is installed. The special promotion may be a live video broadcast, dinner shows, gifts as well as other goods and services. Many different types of gaming information may be visually or aurally communicated using the present invention and is not limited to the examples provided above.

[0069] FIG. 3 is a block diagram of an embodiment of a player tracking unit 300 of the present invention connected to a master gaming controller 104 on a gaming machine and a player tracking server 120. The player tracking unit 300 includes a logic device 310 enclosed in a logic device housing and a number of player tracking

interface devices including a card reader 225, a display 215, a key pad 220, a light panel 216, a microphone 207, a speaker 209, a wireless interface and other player tracking interface devices 356 enclosed in a device housing 311. The logic device 310 for the player tracking unit and the player tracking interface devices may be enclosed
5 in a single housing (see FIGs. 2A-2C) or separate housings.

[0070] The logic device 310 may include a processor for executing software allowing the player tracking unit to perform various player tracking functions such as communicating with the player tracking server 120, communicating with the master gaming controller 104 or operating the various peripheral devices such as the card
10 reader 225, the display 215, the key pad 220 and the light panel 216. For instance, the logic device 310 may send messages containing player tracking information to the display 215. As another example, the logic device 310 may send commands to the light panel 216 to display a particular light pattern and to the speaker 209 to project a sound to visually and aurally convey game information. The logic device 310 may
15 utilize a microprocessor and/or microcontrollers. For instance, the light panel 216 may include a microcontroller that converts signals from the processor 302 to voltage levels for one or more illumination devices. In one embodiment, application software for the player tracking unit 300 and configuration information for the player tracking unit may be stored in a memory device such as an EPROM 308, a non-volatile
20 memory, hard drive or a flash memory.

[0071] The player tracking unit may include a memory 316 configured to store: 1) player tracking software 314 such as data collection software, 2) player tracking communication protocols (e.g. 320) allowing the player tracking unit 300 to communicate with different types of player tracking servers, 3) device drivers for
25 many types of player tracking interface devices (e.g. 330), 4) voice recognition software for receiving voice commands from the microphone 207, 5) a secondary memory storage device such as a non-volatile memory device, configured to store gaming software related information (The gaming software related information and memory may be used in a game download process or other software download
30 process.), and 6) communication transport protocols (e.g. 340) such as TCP/IP, USB, Firewire, IEEE1394, Bluetooth, IEEE 802.11a, IEEE 802.11b, IEEE 802.11x (e.g. other IEEE 802.11 standards), hiperlan/2, and HomeRF allowing the player tracking unit to communicate with devices using these protocols or communication protocols

allowing the logic device to communicate with different types of master gaming controllers (e.g. master gaming controllers using different types of communication protocols), such as 104. Typically, the master gaming controller, such as 104, communicates using a serial communication protocol. A few examples of serial communication protocols that may be used to communicate with the master gaming controller include but are not limited to USB, RS-232 and Netplex (a proprietary protocol developed by IGT, Reno, NV).

[0072] A plurality of device drivers may be stored in memory 316 for each type of player tracking device. For example, device drivers for five different types of card readers, six different types of displays and 8 different types of key pads may be stored in the memory 316. When one type of a particular peripheral device is exchanged for another type of the particular device, a new device driver may be loaded from the memory 316 by the processor 302 to allow communication with the device. For instance, one type of card reader in the player tracking unit 300 may be replaced with a second type of card reader where device drivers for both card readers are stored in the memory 316.

[0073] In some embodiments, the software units stored in the memory 316 may be upgraded as needed. For instance, when the memory 316 is a hard drive, new device drivers or new communication protocols may be uploaded to the memory from the master gaming controller 104, the player tracking server 120 or from some other external device. As another example, when the memory 316 is a CD/DVD drive containing a CD/DVD designed or configured to store the player tracking software 314, the device drivers and other communication protocols, the software stored in the memory may be upgraded by replacing a first CD/DVD with a second CD/DVD. In yet another example, when the memory 316 uses one or more flash memory units designed or configured to store the player tracking software 314, the device drivers and other communication protocols, the software stored in the flash memory units may be upgraded by replacing one or more flash memory units with new flash memory units storing the upgraded software. In another embodiment, one or more of the memory devices, such as the hard-drive, may be employed in a game software or player tracking software download process from a remote software server.

[0074] In one embodiment of the present invention, a minimal set of player tracking software applications 314, communication protocols 340, player tracking

communication protocols and device drivers may be stored on in the memory 316. For instance, an operating system, a communication protocol allowing the player tracking unit 300 to communicate with a remote server such as the player tracking server 120 and one or more common player tracking applications may be stored in memory 316.

5 When the player tracking unit is powered-up, the player tracking unit 300 may contact a remote server 120 and download specific player tracking software from the remote software. The downloaded software may include but is not limited to one or more particular player tracking applications that are supported by the remote server, particular device drivers, player tracking software upgrades, and a particular
10 communication protocol supported by the remote server. Details of this method are described in co-pending U.S. Application No. 09/838,033, filed on March 19, 2001, by Criss-Puskiewicz, et al., entitled, "UNIVERSAL PLAYER TRACKING SYSTEM," which is incorporated herein in its entirety and all for purposes

[0075] In some embodiments, the player tracking functions may be implemented
15 by both the logic device 310 and the master gaming controller 104. For instance, the master gaming controller may execute voice recognition software to interpret voice commands input from the microphone 207. Thus, player tracking software such as the player tracking protocols may be stored on a memory located on the gaming machine which is separate from the player tracking unit. In some embodiments, the player
20 tracking software stored on the memory on the gaming machine may be executed by the master gaming controller 104 on the gaming machine in other embodiments, the player tracking software stored on the memory on the gaming machine may be executed by the logic device 310 on the player tracking unit.

[0076] The logic device 310 includes a network interface board 306 configured or
25 designed to allow communication between the player tracking unit 300 and other remote devices such as the player tracking server residing on local area networks, such as a casino area network, a personal area network such as a piconet (e.g. using Bluetooth), or a wide area network such as the Internet. The network interface board 306 may allow wireless or wired communication with the remote devices. The
30 network interface board may be connected to a firewall 312. The firewall may be hardware, software or combinations of both that prevent illegal access of the gaming machine by an outside entity connected to the gaming machine. The internal firewall is designed to prevent someone such as a hacker from gaining illegal access to the

player tracking unit or gaming machine and tampering with it in some manner. For instance, an illegal access may be an attempt to plant a program in the player tracking unit that alters the operation of the gaming machine allowing it to perform an unintended function.

5 **[0077]** The communication board 304 may be configured to allow communication between the logic device 310 and the player tracking interface devices including 225, 215, 220, 216, 207, 209 and 356 and to allow communication between the logic device 310 and the master gaming controller 104. The wireless interface 264 may be used to allow the player tracking unit and possibly the master gaming controller 104
10 to communicate with portable wireless devices or stationary devices using a wireless communication standard. The wireless interface 264 may be connected to an antenna 357. In some embodiments, the wireless interface 264 may be incorporated into the communication board 304. In addition, in some embodiments, the logic device 310 and the master gaming controller 104 may communicate using a non-proprietary
15 standard wireless communication protocol such as Bluetooth, IEEE 802.11a, IEEE802.11b, IEEE802.11x (e.g. other IEEE802.11 standards), hipervlan/2, and HomeRF or using a non-proprietary standard wired communication protocol such as USB, Firewire, IEEE 1394 and the like. In the past, gaming machine have primarily used proprietary standards for communications between gaming devices. In other
20 embodiments, the logic device 310 and the master gaming controller may communicate using a proprietary communication protocol used by the manufacturer of the gaming machine.

[0078] The communication between the player tracking unit 300 and 1) the player tracking interface devices, 2) the master gaming controller 104, 3) the player tracking
25 server 120 and 4) any other external or internal gaming devices may be encrypted. In one embodiment, the logic device 310 may poll the player tracking interface devices for information. For instance, the logic device 310 may poll the card reader 225 to determine when a card has been inserted into the card reader or may poll the key pad 220 to determine when a button key has been depressed. In some embodiments, the
30 player tracking interface devices may contact the logic device 310 when a player tracking event such as a card being inserted into the card reader has occurred.

[0079] The logic device 310 may poll the master gaming controller 104 for game usage information. For instance, the logic device 310 may send a message to the

master gaming controller 104 such as “coin-in”. The master gaming controller may respond to the “coin-in” message with an amount when credits are registered on the gaming machine.

5 [0080] The logic device 310, using an appropriate device driver, may send instructions to the various player tracking interface devices to perform specific operations. For instance, after a card has been inserted into the card reader 225, the processor logic device may send a “read card” instruction to the card reader, a “display message A” instruction to the display 215 and a “good luck” voice message to speaker 209. In addition, the logic device 310 may be configured to allow the
10 master gaming controller 104 to send instructions to the player tracking interface devices via the logic device 310. As an example, after a card has been inserted into the card reader 225, the processor logic 310 may determine that the card is for a gaming application controlled by the master gaming controller 204 and send a message to the master gaming controller 104 indicating a card has been inserted into
15 the card reader. In response, to the message from the logic device, the master gaming controller 104 may send a series of commands to the player tracking interface devices such as a “read card” instruction to the card reader 225, a flash light pattern “A” command to the light panel 216, and a “display message” instruction to the display 215 via the logic device 310. The instructions from the master gaming controller 104
20 to the player tracking interface devices may be obtained from gaming application software executed by the master gaming controller 104. The gaming application software may or may not be related to player tracking services.

[0081] The player tracking unit 300 may include one or more standard peripheral communication connections (not shown). The logic device 310 may be designed or
25 configured to communicate with the master gaming controller 104 and the player tracking interface devices using a standard peripheral connection, such as an USB connector, and using a standard communication protocol, such as USB. The USB standard allows for a number of standard USB connectors that may be used with the present invention. The player tracking unit 300 may contain a hub connected to the
30 peripheral communication connection and containing a plurality of peripheral communication connections. Details of using a standard peripheral communication connection are described in U.S. patent No.6,251,014, issued June 26, 2001, by

Stockdale, et al., entitled, "STANDARD PERIPHERAL COMMUNICATION," which is incorporated herein in its entirety and for all purposes.

5 [0082] The standard method of operation for IGT game software is to use a state machine. Different functions of the game (bet, play, result, points in the graphical presentation, etc.) may be defined as a state. When a game moves from one state to another, critical data regarding the game software is stored in a custom non-volatile memory subsystem 103. This is critical to ensure the player's wager and credits are preserved and to minimize potential disputes in the event of a malfunction on the gaming machine.

10 [0083] The state machine methodology may be extended to the player tracking unit 300. In embodiments of the present invention, the player tracking unit 300 may be used to provide games of chance including bonus games and game transactions, such as comps, credit transfers, and reservations. The games of chance and game transactions may involve an exchange of cash, indicia of credit or other items of
15 tangible value. Thus, it may be desirable to track the state of the player tracking unit in a manner similar to a gaming machine.

[0084] In general, a state machine, such as the player tracking unit 300 or a gaming machine does not advance from a first state to a second state until critical information that allows the first state to be reconstructed is stored. Every operating
20 parameter of the gaming device and its associated peripheral devices does not have to be stored for the purposes of reconstructing a particular state. A subset of operating parameters may be defined that allows important features of a given state to be reconstructed, such as credits remaining on the gaming device, an outcome of a game played or the defining parameters of transaction that has been performed on the
25 gaming device.

[0085] The state machine feature allows the gaming device, such as a gaming machine or the player tracking unit, to recover its operation to a particular defined state in the event of a malfunction, loss of power, etc, that occurred just prior to the malfunction. For example, after the state of the gaming device is restored during the
30 play of a game of chance, game play may resume and the game may be completed in a manner that is consistent with the play of the game when the malfunction had not occurred. Typically, battery backed RAM devices or other non-volatile memory devices are used to preserve this critical data although other types of non-volatile

memory devices may be employed, such as flash memory, a hard drive or a Magnetic RAM memory. Some details of using providing a state machine and using a NV-RAM to preserve state information are described in co-pending U.S. Application 10/912,262, filed August 4, 2004, by Stockdale, et al., and entitled "HIGH
5 PERFORMANCE BATTERY BACKED RAM INTERFACE," which is incorporated herein by reference and for all purposes.

[0086] As described in the preceding paragraphs, when a malfunction occurs during play of a game of chance, the gaming device, such as a slot machine or the player tracking unit 300, may be restored to a state in the game of chance just prior to
10 when the malfunction occurred. The restored state may include metering information and graphical information that was displayed on the gaming machine in the state prior to the malfunction. For example, when the malfunction occurs during the play of a card game after the cards have been dealt, the gaming machine may be restored with the cards that were previously displayed as part of the card game. As another
15 example, a bonus game may be triggered during the play of a game of chance where a player is required to make a number of selections on a video display screen. When a malfunction has occurred after the player has made one or more selections, the gaming device may be restored to a state that shows the graphical presentation at the just prior to the malfunction including an indication of selections that have already
20 been made by the player. In general, the gaming device may be restored to any state in a plurality of defined states that occur while the gaming device is operated.

[0087] Game history information and transaction information regarding previous games played on the gaming device or transactions performed on the gaming device may also be stored in a non-volatile memory device, such as 103 or 303. For a game
25 played on a gaming device, the stored information may include but is not limited to an amount wagered, the outcome of the game and so forth. For a gaming transaction, the stored information may include parameters defining the transaction, such as an amount of player tracking points exchanged for a comp and the account balance before and after the exchange, a number of promotional credits converted from player
30 tracking points and transferred to the gaming device, an account balance before cash or credits have been transferred to or from a remote account or the details of a reservation made using the gaming device.

[0088] The information stored in the non-volatile memory may be detailed enough to reconstruct a portion of the graphical presentation that was previously presented on one or more of the displays of a gaming device and the state of the gaming device (e.g., credits) at the time the game of chance was played. For example, 5 if a malfunction occurs on the player tracking unit 300 during a transaction, such as transferring credits from a remote account to the gaming machine using a touch screen interface on 300, the player tracking unit may be operable to restore itself to a first state that occurred prior to the malfunction where the state may include but is not limited to information that was displayed on the touch screen interface prior to the 10 malfunction, a state of a light panel 216, and states of other peripheral devices coupled to the player tracking unit 300.

[0089] The game history information and transaction history information stored in the non-volatile memory may be utilized in the event of a dispute. For example, a player may decide that in a previous game of chance that they did not receive credit 15 for an award that they believed they won. The game history information may be used to reconstruct the state of the gaming machine prior, during and/or after the disputed game to demonstrate whether the player was correct or not in their assertion. As another example, a player may dispute that player tracking points were improperly subtracted from the account during a "comping" transaction performed on the player 20 tracking unit. The transaction history information may be used to reconstruct the transaction that was performed.

[0090] In one embodiment, screen shots of information displayed on a gaming device, such as a player tracking unit 300, may be stored to the non-volatile memory for recall during a dispute or for auditing purposes. In another embodiment, 25 information used to reconstruct a screen shot at a particular state of the gaming device, such as information provided as input to a web-page displayed on a gaming device, may be stored in a manner that allows the screen shot at the saved state to be reconstructed. A retrieval and reconstruction code may be provided with the gaming device to recreate the screen shot at a saved state using the information stored in the 30 non-volatile memory. Details of saving screen shots are described in co-pending U.S. application no. 10/758,828, filed January 15, 2004, which is incorporated by reference and for all purposes.

[0091] The gaming device, such as a gaming machine or player tracking unit 300, may be operable to reconstruct its overall state from the sub-states of a number of peripheral devices coupled to the gaming machine. For example, in one embodiment, the peripheral devices coupled to the gaming machine, such as a bill acceptor or coin acceptor may be operable to store critical information describing their state to a non-volatile memory located on the peripheral device. The critical information regarding their state may be also transmitted to the master gaming controller 104 on the gaming machine and stored to a non-volatile memory 103 used by the master gaming controller.

[0092] In the event of a malfunction or tilt condition on the gaming machine, such as a power failure, the gaming machine may be operable to restore itself to a state that occurred prior to the malfunction using the information stored in the non-volatile memory controlled by the master gaming controller and optionally using information stored in the non-volatile memories of one or more peripheral devices coupled to the gaming machine. Details of maintaining and recovering the state of the gaming machine including storing peripheral state information on a non-volatile memory located on the peripheral device that may be used with the present invention are described in U.S. patent No.6,251,014, issued June 26, 2001, by Stockdale, et al., entitled, "Standard Peripheral Communication," previously incorporated herein.

[0093] In another embodiment, multiple independent gaming device states may be maintained on a gaming machine. For example, a player tracking unit 310 of the present invention may include a player tracking controller 310 and non-volatile memory 303 separate from the master gaming controller 104 and the non-volatile memory 103 used by the master gaming controller. The player tracking unit 300 may be coupled to the gaming machine and in communication with the master gaming controller 104. During operation of a gaming machine, the master gaming controller 104 and the player tracking controller 103 may each manage their respective states and store critical information relative to their states in their respective non-volatile memories independently of one another.

[0094] In general, the master gaming controller and the player tracking controller operate relatively independent of one another although they may exchange information. Thus, the master gaming controller state maintained by the master gaming controller 104 and the player tracking controller state maintained by the

player tracking controller 310 may each be defined a unique set of parameters that reflect the respective functions of each device. After a malfunction or tilt condition has occurred, the master gaming controller or the player tracking controller may be each be designed respectively to restore itself to a previous state that it has maintained.

[0095] The potential malfunctions and tilt conditions that could affect the master gaming controller or the player tracking controller may vary between the devices and may occur at different times for each device. For example, a potential tilt condition for the player tracking controller 310 may be a user trying to redeem credits or a comp using a stolen player tracking card. This tilt condition may not affect the master gaming controller 104 (i.e., it may not cause a tilt condition on the master gaming controller). A potential tilt condition for the master gaming controller 104 may be a detection of an open door on the gaming machine. This tilt condition may not affect the player tracking controller 310 (i.e., it may not cause a tilt condition on the player tracking unit). Nevertheless, in some embodiments, the player tracking controller 310 or the master gaming controller 104 may be operable to trigger a tilt condition on one another such that when the master gaming controller 104 detects a tilt condition it triggers a tilt condition in the player tracking controller 310 or visa versa.

[0096] Malfunctions may affect both the master gaming controller and the player tracking controller or only one device or the other. For example, a power failure to the gaming machine may result in a condition where the master gaming controller and the player tracking controller each restore itself to a previous state respectively when power is restored. Whereas, in another example, a malfunction of a peripheral device coupled to the master gaming controller may result in the master gaming controller restoring itself to a previous state prior to the malfunction after the peripheral device is fixed while the player tracking unit and player tracking controller remain unaffected.

[0097] In operation, the master gaming controller and the player tracking controller may share information and thus affect each other's state. Thus, some state information may be reflected in both the player tracking controller state and the master gaming controller state. For example, the player tracking unit may be used to transfer credits to the gaming machine. In this case, after a successful transfer of credits, the master gaming controller state and the player tracking controller state may

both reflect the credit transfer. However, if a malfunction or tilt condition occurs during the transfer of credits from the player tracking controller to the master gaming controller, then the player tracking controller state may reflect the credit transfer information but not the master gaming controller. Therefore, in some embodiments, a determination of the state of a gaming machine with a player tracking unit 300, may require state information from both the player tracking controller 310 and the master gaming controller 104.

[0098] Turning to FIGURE 4, more details of using a player tracking system in the context of game play on a gaming machine are described. In FIG. 4, a video gaming machine 2 of the present invention is shown. Machine 2 includes a main cabinet 4, which generally surrounds the machine interior (See Fig. 1) and is viewable by users. The main cabinet includes a main door 8 on the front of the machine, which opens to provide access to the interior of the machine. Attached to the main door are player-input switches or buttons 32, a coin acceptor 28, and a bill validator 30, a coin tray 38, and a belly glass 40. Viewable through the main door is a video display monitor 34 and an information panel 36. The display monitor 34 will typically be a cathode ray tube, high resolution flat-panel LCD, or other conventional electronically controlled video monitor. The information panel 36 may be a back-lit, silk screened glass panel with lettering to indicate general game information including, for example, the number of coins played. The bill validator 30, player-input switches 32, video display monitor 34, and information panel are devices used to play a game on the game machine 2. The devices are controlled by circuitry (see FIG.1) housed inside the main cabinet 4 of the machine 2.

[0099] Many possible games, including traditional slot games, video slot games, video poker, video black jack, video keno, video pachinko, lottery games, bingo games and other games of chance as well as bonus games may be provided with gaming machines and player tracking units of this invention. The results of the games may be determined using a random number generator located on the gaming machine or player tracking unit, the results may be generated remotely (e.g., centrally determined for lottery and bingo games) and sent to the gaming machine or combinations thereof. For instance, the result of a game of chance may be generated on the gaming machine and the result for a bonus game played on the gaming machine may be generated on a player tracking unit and sent to the gaming machine.

[00100] The gaming machine 2 includes a top box 6, which sits on top of the main cabinet 4. The top box 6 houses a number of devices, which may be used to add features to a game being played on the gaming machine 2, including speakers 10, 12, 14, a ticket printer 18 which may print bar-coded tickets 20 used as cashless instruments. The player tracking unit mounted within the top box 6 includes a key pad 22 for entering player tracking information, a florescent display 16 for displaying player tracking information, a card reader 24 for entering a magnetic striped card containing player tracking information, a microphone 43 for inputting voice data, a speaker 42 for projecting sounds and a light panel 44 for display various light patterns used to convey gaming information. A player playing a game on the gaming machine 2 or a person near the gaming machine may view the light patterns from the light panel 216. In other embodiments, the player tracking unit and associated player tracking interface devices, such as 16, 22, 24, 42, 43 and 44, may be mounted within the main cabinet 4 of the gaming machine, on top of the gaming machine, or on the side of the main cabinet of the gaming machine.

[00101] Understand that gaming machine 2 is but one example from a wide range of gaming machine designs on which the present invention may be implemented. For example, not all suitable gaming machines have top boxes or player tracking features. Further, some gaming machines have only a single game display – mechanical or video, while others are designed for bar tables and have displays that face upwards. As another example, a game may be generated in on a host computer and may be displayed on a remote terminal or a remote gaming device. The remote gaming device may be connected to the host computer via a network of some type such as a local area network, a wide area network, an intranet or the Internet. The remote gaming device may be a portable gaming device such as but not limited to a cell phone, a personal digital assistant, and a wireless game player. Images rendered from 3-D gaming environments may be displayed on portable gaming devices that are used to play a game of chance. Further a gaming machine or server may include gaming logic for commanding a remote gaming device to render an image from a virtual camera in a 3-D gaming environments stored on the remote gaming device and to display the rendered image on a display located on the remote gaming device. Thus, those of skill in the art will understand that the present invention, as described below, can be deployed on most any gaming machine now available or hereafter developed.

[00102] Some preferred gaming machines of the present assignee are implemented with special features and/or additional circuitry that differentiates them from general-purpose computers (e.g., desktop PC's and laptops). Gaming machines are highly regulated to ensure fairness and, in many cases, gaming machines are operable to dispense monetary awards of multiple millions of dollars. Therefore, to satisfy security and regulatory requirements in a gaming environment, hardware and software architectures may be implemented in gaming machines that differ significantly from those of general-purpose computers. A description of gaming machines relative to general-purpose computing machines and some examples of the additional (or different) components and features found in gaming machines are described below.

[00103] At first glance, one might think that adapting PC technologies to the gaming industry would be a simple proposition because both PCs and gaming machines employ microprocessors that control a variety of devices. However, because of such reasons as 1) the regulatory requirements that are placed upon gaming machines, 2) the harsh environment in which gaming machines operate, 3) security requirements and 4) fault tolerance requirements, adapting PC technologies to a gaming machine can be quite difficult. Further, techniques and methods for solving a problem in the PC industry, such as device compatibility and connectivity issues, might not be adequate in the gaming environment. For instance, a fault or a weakness tolerated in a PC, such as security holes in software or frequent crashes, may not be tolerated in a gaming machine because in a gaming machine these faults can lead to a direct loss of funds from the gaming machine, such as stolen cash or loss of revenue when the gaming machine is not operating properly.

[00104] For the purposes of illustration, a few differences between PC systems and gaming systems will be described. A first difference between gaming machines and common PC based computers systems is that gaming machines are designed to be state-based systems. In a state-based system, the system stores and maintains its current state in a non-volatile memory, such that, in the event of a power failure or other malfunction the gaming machine will return to its current state when the power is restored. For instance, if a player was shown an award for a game of chance and, before the award could be provided to the player the power failed, the gaming machine, upon the restoration of power, would return to the state where the award is indicated. As anyone who has used a PC, knows, PCs are not state machines and a

majority of data is usually lost when a malfunction occurs. This requirement affects the software and hardware design on a gaming machine.

[00105] A second important difference between gaming machines and common PC based computer systems is that for regulation purposes, the software on the gaming machine used to generate the game of chance and operate the gaming machine has been designed to be static and monolithic to prevent cheating by the operator of gaming machine. For instance, one solution that has been employed in the gaming industry to prevent cheating and satisfy regulatory requirements has been to manufacture a gaming machine that can use a proprietary processor running instructions to generate the game of chance from an EPROM or other form of non-volatile memory. The coding instructions on the EPROM are static (non-changeable) and must be approved by a gaming regulators in a particular jurisdiction and installed in the presence of a person representing the gaming jurisdiction. Any changes to any part of the software required to generate the game of chance, such as adding a new device driver used by the master gaming controller to operate a device during generation of the game of chance can require a new EPROM to be burnt, approved by the gaming jurisdiction and reinstalled on the gaming machine in the presence of a gaming regulator. Regardless of whether the EPROM solution is used, to gain approval in most gaming jurisdictions, a gaming machine must demonstrate sufficient safeguards that prevent an operator or player of a gaming machine from manipulating hardware and software in a manner that gives them an unfair and some cases an illegal advantage. The gaming machine should have a means to determine if the code it will execute is valid. If the code is not valid, the gaming machine must have a means to prevent the code from being executed. The code validation requirements in the gaming industry affect both hardware and software designs on gaming machines.

[00106] A third important difference between gaming machines and common PC based computer systems is the number and kinds of peripheral devices used on a gaming machine are not as great as on PC based computer systems. Traditionally, in the gaming industry, gaming machines have been relatively simple in the sense that the number of peripheral devices and the number of functions the gaming machine has been limited. Further, in operation, the functionality of gaming machines were relatively constant once the gaming machine was deployed, i.e., new peripherals devices and new gaming software were infrequently added to the gaming machine.

This differs from a PC where users will go out and buy different combinations of devices and software from different manufacturers and connect them to a PC to suit their needs depending on a desired application. Therefore, the types of devices connected to a PC may vary greatly from user to user depending in their individual requirements and may vary significantly over time.

[00107] Although the variety of devices available for a PC may be greater than on a gaming machine, gaming machines still have unique device requirements that differ from a PC, such as device security requirements not usually addressed by PCs. For instance, monetary devices, such as coin dispensers, bill validators and ticket printers and computing devices that are used to govern the input and output of cash to a gaming machine have security requirements that are not typically addressed in PCs. Therefore, many PC techniques and methods developed to facilitate device connectivity and device compatibility do not address the emphasis placed on security in the gaming industry.

[00108] To address some of the issues described above, a number of hardware/software components and architectures are utilized in gaming machines that are not typically found in general purpose computing devices, such as PCs. These hardware/software components and architectures, as described below in more detail, include but are not limited to watchdog timers, voltage monitoring systems, state-based software architecture and supporting hardware, specialized communication interfaces, security monitoring and trusted memory.

[00109] A watchdog timer is normally used in IGT gaming machines to provide a software failure detection mechanism. In a normally operating system, the operating software periodically accesses control registers in the watchdog timer subsystem to “re-trigger” the watchdog. Should the operating software fail to access the control registers within a preset timeframe, the watchdog timer will timeout and generate a system reset. Typical watchdog timer circuits contain a loadable timeout counter register to allow the operating software to set the timeout interval within a certain range of time. A differentiating feature of the some preferred circuits is that the operating software cannot completely disable the function of the watchdog timer. In other words, the watchdog timer always functions from the time power is applied to the board.

[00110] IGT gaming computer platforms preferably use several power supply voltages to operate portions of the computer circuitry. These can be generated in a central power supply or locally on the computer board. If any of these voltages falls out of the tolerance limits of the circuitry they power, unpredictable operation of the computer may result. Though most modern general-purpose computers include voltage monitoring circuitry, these types of circuits only report voltage status to the operating software. Out of tolerance voltages can cause software malfunction, creating a potential uncontrolled condition in the gaming computer. Gaming machines of the present assignee typically have power supplies with tighter voltage margins than that required by the operating circuitry. In addition, the voltage monitoring circuitry implemented in IGT gaming computers typically has two thresholds of control. The first threshold generates a software event that can be detected by the operating software and an error condition generated. This threshold is triggered when a power supply voltage falls out of the tolerance range of the power supply, but is still within the operating range of the circuitry. The second threshold is set when a power supply voltage falls out of the operating tolerance of the circuitry. In this case, the circuitry generates a reset, halting operation of the computer.

[00111] The standard method of operation for IGT slot machine game software is to use a state machine. Different functions of the game (bet, play, result, points in the graphical presentation, etc.) may be defined as a state. When a game moves from one state to another, critical data regarding the game software is stored in a custom non-volatile memory subsystem. This is critical to ensure the player's wager and credits are preserved and to minimize potential disputes in the event of a malfunction on the gaming machine.

[00112] In general, the gaming machine does not advance from a first state to a second state until critical information that allows the first state to be reconstructed is stored. This feature allows the game to recover operation to the current state of play in the event of a malfunction, loss of power, etc that occurred just prior to the malfunction. After the state of the gaming machine is restored during the play of a game of chance, game play may resume and the game may be completed in a manner that is no different than if the malfunction had not occurred. Typically, battery backed RAM devices are used to preserve this critical data although other types of non-

volatile memory devices may be employed. These memory devices are not used in typical general-purpose computers.

[00113] As described in the preceding paragraph, when a malfunction occurs during a game of chance, the gaming machine may be restored to a state in the game of chance just prior to when the malfunction occurred. The restored state may include metering information and graphical information that was displayed on the gaming machine in the state prior to the malfunction. For example, when the malfunction occurs during the play of a card game after the cards have been dealt, the gaming machine may be restored with the cards that were previously displayed as part of the card game. As another example, a bonus game may be triggered during the play of a game of chance where a player is required to make a number of selections on a video display screen. When a malfunction has occurred after the player has made one or more selections, the gaming machine may be restored to a state that shows the graphical presentation at the just prior to the malfunction including an indication of selections that have already been made by the player. In general, the gaming machine may be restored to any state in a plurality of states that occur in the game of chance that occurs while the game of chance is played or to states that occur between the play of a game of chance.

[00114] Game history information regarding previous games played such as an amount wagered, the outcome of the game and so forth may also be stored in a non-volatile memory device. The information stored in the non-volatile memory may be detailed enough to reconstruct a portion of the graphical presentation that was previously presented on the gaming machine and the state of the gaming machine (e.g., credits) at the time the game of chance was played. The game history information may be utilized in the event of a dispute. For example, a player may decide that in a previous game of chance that they did not receive credit for an award that they believed they won. The game history information may be used to reconstruct the state of the gaming machine prior, during and/or after the disputed game to demonstrate whether the player was correct or not in their assertion.

[00115] Another feature of gaming machines, such as IGT gaming computers, is that they often contain unique interfaces, including serial interfaces, to connect to specific subsystems internal and external to the slot machine. The serial devices may have electrical interface requirements that differ from the "standard" EIA 232 serial

interfaces provided by general-purpose computers. These interfaces may include EIA 485, EIA 422, Fiber Optic Serial, optically coupled serial interfaces, current loop style serial interfaces, etc. In addition, to conserve serial interfaces internally in the slot machine, serial devices may be connected in a shared, daisy-chain fashion where
5 multiple peripheral devices are connected to a single serial channel.

[00116] The serial interfaces may be used to transmit information using communication protocols that are unique to the gaming industry. For example, IGT's Netplex is a proprietary communication protocol used for serial communication between gaming devices. As another example, SAS is a communication protocol used
10 to transmit information, such as metering information, from a gaming machine to a remote device. Often SAS is used in conjunction with a player tracking system.

[00117] IGT gaming machines may alternatively be treated as peripheral devices to a casino communication controller and connected in a shared daisy chain fashion to a single serial interface. In both cases, the peripheral devices are preferably assigned
15 device addresses. If so, the serial controller circuitry must implement a method to generate or detect unique device addresses. General-purpose computer serial ports are not able to do this. unique device addresses. General-purpose computer serial ports are not able to do this.

[00118] Security monitoring circuits detect intrusion into an IGT gaming machine by monitoring security switches attached to access doors in the slot machine cabinet. Preferably, access violations result in suspension of game play and can trigger additional security operations to preserve the current state of game play. These circuits also function when power is off by use of a battery backup. In power-off operation, these circuits continue to monitor the access doors of the slot machine.
20 When power is restored, the gaming machine can determine whether any security violations occurred while power was off, e.g., via software for reading status registers. This can trigger event log entries and further data authentication operations by the slot machine software.

[00119] Trusted memory devices are preferably included in an IGT gaming machine computer to ensure the authenticity of the software that may be stored on less
30 secure memory subsystems, such as mass storage devices. Trusted memory devices and controlling circuitry are typically designed to not allow modification of the code and data stored in the memory device while the memory device is installed in the slot

machine. The code and data stored in these devices may include authentication algorithms, random number generators, authentication keys, operating system kernels, etc. The purpose of these trusted memory devices is to provide gaming regulatory authorities a root trusted authority within the computing environment of the slot machine that can be tracked and verified as original. This may be accomplished via removal of the trusted memory device from the slot machine computer and verification of the secure memory device contents is a separate third party verification device. Once the trusted memory device is verified as authentic, and based on the approval of the verification algorithms contained in the trusted device, the gaming machine is allowed to verify the authenticity of additional code and data that may be located in the gaming computer assembly, such as code and data stored on hard disk drives. A few details related to trusted memory devices that may be used in the present invention are described in U.S. patent no. 6,685,567 from U.S. patent application no. 09/925,098, filed August 8, 2001 and titled "Process Verification," which is incorporated herein in its entirety and for all purposes.

[00120] Mass storage devices used in a general purpose computer typically allow code and data to be read from and written to the mass storage device. In a gaming machine environment, modification of the gaming code stored on a mass storage device is strictly controlled and would only be allowed under specific maintenance type events with electronic and physical enablers required. Though this level of security could be provided by software, IGT gaming computers that include mass storage devices preferably include hardware level mass storage data protection circuitry that operates at the circuit level to monitor attempts to modify data on the mass storage device and will generate both software and hardware error triggers should a data modification be attempted without the proper electronic and physical enablers being present.

[00121] Returning to the example of Figure 4, when a user wishes to play the gaming machine 2, he or she inserts cash through the coin acceptor 28 or bill validator 30. In addition, the player may use a cashless instrument of some type to register credits on the gaming machine 2. For example, the bill validator 30 may accept a printed ticket voucher, including 20, as an indicia of credit. As another example, the card reader 24 may accept a debit card or a smart card containing cash or credit information that may be used to register credits on the gaming machine.

[00122] Prior to beginning a game play session on the gaming machine 2, a player may insert a player tracking card into the card reader 24 to initiate a player tracking session. In some embodiments, after inserting their card, the player may be visually prompted on the display screen 16 or aurally prompted using the speaker to enter
5 identification information such as a PIN code using the key pad 22. Typically, the player tracking card may remain in the card reader 24 during the game play session. As another example, the gaming machine may transfer player tracking information from portable wireless device worn by the player via a wireless interface device (not shown) on the gaming machine 2. An advantage of using a portable wireless device is
10 that the transfer of player tracking information is automatic and the player does not have to remember to correctly insert a player tracking card into the gaming machine.

[00123] In a player tracking session on the gaming machine, features of the player's game play during a game play session on the gaming machine, such as an amount wagered during the game play session, may be converted to player tracking
15 points and stored in the player's player tracking account on a player tracking server. Later, accumulated player tracking points may be redeemed for rewards or "comps" for the player such as free meals or free rooms. Usually, the player tracking card inserted into the card reader contains at least player tracking account information. When the card is inserted correctly into the card reader 24, the information stored on
20 the card, such as the player's account information, may be read by the card reader and transferred by a logic device on the player tracking unit (see FIG. 3) to the player tracking server. The player tracking account information allows the player tracking server to store player tracking points accumulated during the game play session to the appropriate account. When player tracking information is not provided by the player,
25 for instance, when the player tracking card has been inserted incorrectly into the card reader 24, player tracking points are not accumulated.

[00124] During the course of a game, a player may be required to make a number of decisions, which affect the outcome of the game. For example, a player may vary his or her wager on a particular game, select a prize for a particular game, or make
30 game decisions which affect the outcome of a particular game. The player may make these choices using the player-input switches 32, the video display screen 34 or using some other device which enables a player to input information into the gaming machine. Certain player choices may be captured by player tracking software loaded

in a memory inside of the gaming machine. For example, the rate at which a player plays a game or the amount a player bets on each game may be captured by the player tracking software.

5 [00125] During certain game events, the gaming machine 2 may display visual and auditory effects that can be perceived by the player. These effects add to the excitement of a game, which makes a player more likely to continue playing. Auditory effects include various sounds that are projected by the speakers 10, 12, 14. Visual effects include flashing lights, strobing lights or other patterns displayed from lights on the gaming machine 2, from lights behind the belly glass 40 or the light
10 panel on the player tracking unit 44.

[00126] After the player has completed a game, the player may receive game tokens from the coin tray 38 or the ticket 20 from the printer 18, which may be used for further games or to redeem a prize. Further, the player may receive a ticket 20 for food, merchandise, or games from the printer 18. The type of ticket 20 may be related
15 to past game playing recorded by the player tracking software within the gaming machine 2. In some embodiments, these tickets may be used by a game player to obtain game services. In addition, when the player has inserted a player tracking card in the card reader to initiate a player tracking session, to prevent the player from leaving or “abandoning” their card in the card reader 24, a voice message, such as
20 “please remove your card,” may be projected from the sound projection device 44.

[00127] FIGURE 5 is a block diagram of a number of gaming machines each with a player tracking unit connected in a player tracking system where the player tracking units utilize light panels and wireless interface devices to communicate gaming information. Four gaming machines 600, 601, 602 and 603 each with a player
25 tracking unit 200, a light panel 216 and a wireless interface 264 are connected to the player tracking server 120 via the data collection unit 106. As described with respect to FIG. 2, the light panels 216 may be used to visually communicate gaming information to interested parties, such as a game player, a casino service representative, or a maintenance technician. The wireless interface devices 264 may
30 be used to communicate gaming information to a portable wireless devices carried by different individuals such as game players, casino service representatives or a maintenance technician. As described above, wireless communication standard such as Bluetooth, IEEE 802.11a, IEEE802.11b, IEEE802.11x (e.g. other IEEE802.11

standards such as IEEE802.11c, IEEE802.11d, IEEE802.11e, etc.), hiperlan/2, and HomeRF, may be used to provide communications between the wireless interface device 264 and a portable wireless interface device.

5 [00128] The portable wireless devices carried by different individuals may be designed or configured to selectively establish communications with the player tracking units 200 broadcasting various messages via the wireless interfaces 264. For instance, a service wireless interface device 606 may be designed or configured to only establish communications with a player tracking unit when the unit is broadcasting a maintenance request message. Thus, when the service wireless
10 interface device 606 receives another type of message, such as a message indicating a player has requested a drink, the device will ignore the message and not establish communications with the player tracking unit broadcasting that message. In another example, the host wireless interface device 604 may only establish communications with one of the player tracking units 200 when the player tracking unit has determined
15 that a game player with "special" status is at their machine and then, sent a message indicating the status of the player to the host wireless interface device 604.

[00129] In one embodiment, a maintenance technician may carry a portable wireless interface device 606 used for service of a player tracking unit or a gaming machine. A light panel 216 on gaming machine 602 may display a message such as a
20 flashing red light indicating the gaming machine or the player tracking unit requires service. The maintenance technician may see the flashing red light and approach the machine. As the maintenance technician approaches the gaming machine 602 carrying the service wireless interface device 606, in response to a maintenance request message broadcast via wireless interface 264 on gaming machine 602, the service
25 wireless interface device may establish wireless communications with the gaming machine 602. In one embodiment, the service wireless interface device may be a personal digital assistant. The service wireless interface device may also receive broadcast messages from gaming machines 600, 601 and 603. However, unless these other gaming machines are also broadcasting a maintenance request message, the
30 service wireless interface device 606 will not establish communications with these gaming machines. After establishing communications with gaming machine 602, the service wireless interface device 606 may receive information regarding the nature of the maintenance service request. For instance, an interface such as a display screen on

the device 606 may display a message indicating a hopper needs to be filled, a ticket tray needs to be filled or a gaming device is operating incorrectly. Based upon the information displayed on the wireless interface device 606, the maintenance technician may take an appropriate action such as filling the hopper.

5 **[00130]** In another embodiment, a casino service representative may wear portable wireless device, such as a watch with colored lights. The colored lights on the watch may be used to indicate the status of the player. For example, using a portable wireless interface device 602, the player may have established a player tracking session on gaming machine 600. When the casino service representative is within
10 range of the wireless interface device 264 on gaming machine 600, such as walking by the player playing a game on a gaming machine, a light on their watch may flash green to indicate the player is a special customer. The light mechanism on their watch may be activated in response to gaming information received from the wireless interface device 264. The rate of flashing may increase as the casino service
15 representative approaches the player so that the casino service representative can select the correct player if a number of players are playing nearby. The gaming information included in a message broadcast from gaming machine 600 may also indicate a location of the player such as a machine number where they are playing. Thus, a message may be displayed on a visual interface on the watch, such as “go to
20 machine 600.” The casino service representative may then offer the special customer one or more services according to their “status” as determined by the casino.

[00131] In another example, a portable wireless device carried by the casino service representative may include an audio interface of some type such as an ear-piece inserted in their ear. When the casino service representative is within range of
25 the wireless interface device 264, the representative may hear message in response to gaming information received from the wireless interface 264, such as, “Jane Doe at gaming machine 600 is a special customer and likes drink A.” The casino service representative may then respond to the message by asking the player if they would like a drink such as “drink A”.

30 **[00132]** An advantage of using a wireless interface to communicate gaming information, such as a player’s status, to a casino service representative, over using a signaling means such as a light on the player tracking unit is that individuals other than casino personnel are less likely to be able to determine the player’s status. When

anyone can easily discern the signaling means used to indicate the player's status, it may draw undesired attention to the player. For instance, an easily discernable signaling means may increase the special player's chances of becoming a theft target.

[00133] FIGURE 6 is a flow chart of a method for visually providing gaming information on a gaming machine. In 700, an input signal relating to a game event is received by a logic device on the player tracking unit. The input signal may be from but is not limited a gaming machine, a player tracking server, an external device such as a portable wireless device and one or more player tracking interface devices located on the player tracking unit. The input signal may contain gaming information specifying a type of event. For instance, the message the input signal may contain information indicating a player tracking card has been inserted incorrectly. In 705, the player tracking unit may determine a visual and/or aural response to the game event. One response to the game event may be no response. The visual response may be a light pattern to be implemented on one or more illumination devices located on the player tracking unit, such as adjacent to the display. An aural response may be sound or a voice message that will be projected from a sound projection device located on the player tracking unit. A duration of the visual response or aural response may be determined. The visual response and aural response may be repeated for a fixed duration of time. For example, an illumination device may be flashed for 10 seconds or an illumination device may remain illuminated in until an error condition is cleared.

[00134] In 710, one or more illumination devices, such as illumination devices adjacent to a display, near a card reader, behind a back-lit key pad and combinations thereof, be illuminated to convey a visual response to the game event. Also, a sound may be projected from a sound projection device, such as speaker, to convey an aural response to the game event. In 715, in response to a second event, such as the duration of the visual response or aural response ending or an error condition being cleared, the visual response or aural response is terminated. For instance, a player may insert a player tracking card incorrectly and receive a visual response or aural response from the player tracking unit. Then, the player may remove the card and then the visual response or aural response to the incorrectly inserted card may be terminated.

[00135] FIGURE 7 is a block diagram of a player tracking network of the present invention. The player tracking units, 701, 703, 705, 707, 709 and 711 in gaming

machines, 702, 704, 706, 708, 710 and 712, respectively, are capable of displaying multimedia presentations from a number content sources 716. The content sources 716 may include but are not limited to 1) digitally formatted video and audio 717, 2) live video cams, such as feeds from various casino locations, 3) live video 719, such as sporting events and shows offered at the casino, 4) TV and cable programming 720, 5) audio and video programming stored on tapes, 6) movies and music from a DVD tower 722 with a plurality of DVDs, 7) music from a CD tower 723 with a plurality of CDs, 8) Pay-per-view feeds, such as boxing, wrestling or music concerts, and 9) source programming, such as movies and music, delivered via satellite 725. The digital formatted video and audio 717 may include promotions and advertising for display on the player tracking units.

[00136] The transfer of files from content sources to the player tracking units may be coordinated from a video/audio content server 730. The video/audio content server 730 may provide “push” services where digital files for display on the player tracking units are regularly downloaded from the server based upon a schedule programmed into and implemented at the server. These files may be stored in memory on the player tracking units and may be played according to a schedule and/or in response to various events at the gaming machine. The schedule and the events used to trigger the playing of the files may also be regularly updated by the video content server 730. The video content server may be used to provide updates of menus used for “content-on-demand” at the player tracking units. Using these menus provided on the player tracking units, a user may be able to select among the various content 716 sources, which may vary with time, such as receiving a live broadcast of an on-going horserace, boxing match, etc., or pre-recorded materials such as movies, comedy shows, music, etc. Live feeds may be delivered to the player tracking units using streaming technologies via a local area network 732. The “content-on-demand” may be considered a “pull” service in that a user may be able to pull content down to the player tracking unit at any time.

[00137] Via the LAN 732, the player tracking unit may communicate with a number of remote servers, such as but not limited to 1) a player tracking application server 744 providing player tracking and accounting applications, 2) a cashless system server 742 providing cashless services, such as validating printed ticket vouchers used as an indicia of credit, 3) a gaming/player tracking software server 740 providing

downloads of gaming machine software and player tracking software and 4) a messaging server 738 providing location and message communications between two or more player tracking units. The LAN 732 may also be connected to a wide area network 736 and the Internet 734. The player tracking units may be able to communicate with devices connected to the player tracking units over these networks. For instance, a web-browser may be used on the player tracking unit to receive web pages from the Internet 734.

[00138] The player tracking units may include a video display and one or more sound projection devices. An interface for selecting among the content sources available at the player tracking unit may be a TV-like interface and programming may be presented in a TV-program listing format, such as having one that displays all available programs that are available for viewing. The TV-like interface may provide features such as but not limited to input mechanisms for 1) changing “channels” and for selecting programs, 2) volume control, 3) customize the display and 4) control the playback of entertainment content. Because the TV interface is universal, it may allow people to familiarize with the unit quicker. Details of the player tracking display and interface are described in more detail with respect to FIG. 8.

[00139] The player tracking units may be capable of buffering incoming contents for a jitter free replay. Further, the player tracking units may be capable of storing incoming streams for later viewing (i.e., time-shifting). Also, via the user interface, the player may be able to control playback of programs on the player tracking units, such as fast-forwarding and rewinding programs being viewed. In one embodiment, the player tracking units may be capable these playback features for live events, such as, pausing, rewinding and replaying a play from a live football telecast. This capability may be provided by buffering incoming data into memory on the player tracking unit. Thus, operations, such as rewinding, may be performed by accessing the buffered data in memory. Details of multimedia hardware that may be used to provide these and other capabilities in the player tracking units are described with respect to FIGs. 9 and 10.

[00140] The player tracking units may be used in linked gaming applications including cooperative game play and competitive game play where the display on the player tracking unit may be used in conjunction with a main game played on the host gaming machine. In one embodiment, the base game on the host gaming machine may

send commands or executable code to the player tracking unit to supplement the features of the base game played on the gaming machine. In another embodiment, a controller connected to a plurality of player tracking units may track and tally gaming information from a plurality of gaming machines in a linked gaming application, such as tournament play, and send commands or executable code to the player tracking units located on the linked gaming machines to support the linked gaming application. For instance, in tournament play, the controller may send status information, such as a leader board, which may be displayed on the player tracking unit.

[00141] In another embodiment, the player tracking units may have the ability to cache downloaded software in a mass storage for later release to the host gaming machine. This capability may be useful for when the machine is busy, such as when a game is being played on the host gaming machine. The player tracking unit may be capable of providing software maintenance services for itself and/or the gaming machine. For instance, the player tracking unit may be able to determine the status of software on its host gaming machine, connect with a remote server, such as 740, determine whether any upgrades or software fixes are needed for software installed on the gaming machine, and download software from the remote server and then transfer it to the gaming machine.

[00142] In one embodiment, the player tracking units may be used as thin clients with a browser to play games served by a game server. In this embodiment, the games may be implemented using platform independent code, such as JAVA. The JAVA code may be downloaded from the remote server and played using on the player tracking unit using browser software. Details of these and other applications are described with respect to FIG. 11.

[00143] The player tracking units may implement auto-provisioning allowing the devices to self-register to a server such as the IGT Floor Control Server (FCS). The automatic provisioning capability allows a casino to shuffle machines around, add new ones, remove old ones, easily without paper work and (human) data-entry error with the current manual process. Tracking where the machines are and tracking what is their current configuration may also help managing these capital assets according to regulation requirements. This login-and-setup procedure may include registration with the Dynamic Host Configuration Protocol (DHCP) Server, the Network Time Protocol (NTP) server, the File Transfer Protocol (FTP) server, and the FCS server.

Details of auto-provisioning methods are described in more detail with respect to Figs. 12 and 13.

[00144] FIGURE 8 is a block diagram of a user interface for one embodiment of a player tracking unit 200 of the present invention. The display 215 may be from 3 inches to 15 inches in diameter. In one embodiment, the display may be used to display a number of menu items, 801, 802, 803, 805, 806 and 807. The menu items may represent entertainment content sources that may be displayed on the player tracking unit, such as menu items for video on demand or the menu items may represent a table of contents, such as different entertainment content categories, that may lead to detailed menus for each category selected. Therefore, with the present invention, menus may be nested in different layers. Details of other types of menu interfaces that may be used with the present invention are described in co-pending U.S. application no. 09/961,051, filed on September 20, 2001, and entitled "Game Service Interfaces For Player Tracking Touch Screen Display," which is incorporated herein in its entirety and for all purposes.

[00145] The menu items may be selected using a number of different input mechanisms. In one embodiment, the display 215 may include a touch screen 814 that may be used to detect a selection of a menu item. In another embodiment, the menu items may be selected using input buttons 810 and enter button 812. In yet another embodiment, the key pad 220 may be used to menu items or change channels on the display.

[00146] A "TV-like" remote 818 may be used to operate the player tracking unit like a television. The remote 818 may communicate with the player tracking unit via the wireless interface 264 using wireless communications 820. In one embodiment, the remote 818 may be a hand-held unit. In another embodiment, the remote 818 attached or mounted to the gaming machine in some manner. For instance, the remote 818 may be attached to player tracking unit via cable or the remote 818 may be integrated into the gaming machine or a chair attached to the gaming machine.

[00147] Once a program is selected, a video portion of the program may be presented on the display 215 and an audio portion of the program may be projected through the speakers 209 or a user may be able to listen to the audio portion of the program via headphones connected to a headphone jack 944. The user may be able to control playback of the selected program using one or more of 1) control buttons 816

on the touch screen 814, 2) input buttons 810, 812 and 220 on the player tracking unit and 3) input buttons on 812, 813 and 816 on the remote control. The playback control of a program may include but not limited to pause, forward, rewind, play, stop, slow motion, search, mute, volume control and display controls. The interface devices used to input a program selection, output a selected program and control playback features of the program on the player tracking unit may be considered a multimedia interface for the player tracking unit.

[00148] The player tracking unit may include a proximity sensor 960 (also described with respect to FIG. 2C) to detect whether a player is in front of the gaming machine. In one embodiment, the proximity sensor may use an Infrared (IR) sensor, which periodically emits a particular pulse and examine reflected waves. The information from the IR sensor, such as when a player is near the gaming machine may be used to determine when an “attract” program on the player tracking unit is played.

[00149] In one embodiment, the player tracking unit 200 may play music that a user has selected from a music jukebox (audio and/or video), as well as play music that customers have pre-recorded on their memory sticks, flash memory cards, MP-3, player, etc. Therefore, the player tracking unit may include an input interface allowing a user to download digitally formatted video and audio files into the unit. The digital formatted video and audio files may be processed by a multimedia board on the player tracking unit which is described in detail with respect to FIG. 9.

[00150] FIGURE 9 is a block diagram of a multimedia board 900 for a player tracking unit of the present invention. The present invention is not limited to the multimedia board, which is presented for illustrative purposes only. The CPU 902 may be an x86 compatible system on a chip. The chip may also include MMX support, a CRT, a TFT video processor, an NTSC/PAL TV encoder, core logic, a Video Port (VIP) and a Super I/O block. MMX are multimedia instructions that have been built into some brands of micro-processors.

[00151] For memory, the board 900 may employ a 256 KB BIOS FEPROM 926 and a compact flash header 930 for mass storage. The compact flash header 930 may be used with a mass storage device to store digitally formatted audio content and video content that may be played using the multimedia board 900, such as attract features. The compact flash memory may communicate with the CPU 902 via an IDE interface

928. An IDE channel (IDE 1) connected to the IDE interface 928 may provide communication with two external IDE compatible devices, such as CD/DVD-RW drives or a hard drive. A mass storage device connected via the IDE 1 port and the compact flash memory 930 may be used 1) to store player tracking software, 2) as a
5 cache (temporary storage) for gaming machine software and other gaming information that may be downloaded from a game server and 3) to store additional audio content and video content that may be played by the multimedia board 900, such as digitally formatted audio and video files. The software downloaded from the game server may be for the player tracking unit or the gaming machine.

10 **[00152]** The multimedia board 900 may provide a number of video display functions. For instance, the board 900 may include a hardware video accelerator 910 for scaling, filtering and color space conversion. The board 900 may support a number of video interfaces, such as but not limited to, 1) a CRT-Interface (VGA), 2) a TFT-Interface, and 3) a TV-Interface (TV-Out). The TFT interface may support an
15 LVDS (low-voltage differential signal) output 932 via the LCD port.

[00153] The board 900 may include an audio/video decoder 914 to support streaming video applications and to support fast decoding of digitally encoded video files and audio files. A video and/or audio decoder are designed to recognize a digital bit stream encoded in a particular format. Music and video files may be encoded in a
20 number of digital file formats as specified according to a standard. The standard defines a bit stream syntax and the decoder semantics. To be compliant with a particular standard, such as a digital video standard, the decoder implementation needs to correctly interpret the meaning of bits and render the associated image. To increase processing speed, logic for a video decoder or audio decoder may be
25 integrated directly into hardware. For instance, the audio/video decoder 914 and the NTSC/PAL decoder 910 are examples of audio/video decoders integrated into the hardware. In the present invention, the logic for video and audio decoders may also be implemented in software.

[00154] Features of the audio/video decoder 914 may include DVD/MPEG-2
30 decoding and playback, AC-3 decoder, S/PDIF encoder, and a Macrovision protected TV encoder. The decoder 914 may be used with physical formats including but not limited to, DVD, DVD Audio, SVCD, VCD 1.x/2.0, CD-DA. The decoder 914 may be used with video decoding standards including but not limited to MPEG-1, MPEG-

2, MPEG-3 and MPEG-4. The decoder 914 may work with video formats such as but not limited to CCIR 601, CCIR 656, NTSC and PAL. The decoder 914 may provide for modification of video features including but not limited to brightness, color, contrast, gamma controls.

5 **[00155]** For streaming applications, digitally formatted video and audio files may be sent directly to the decoder 914 via the Ethernet controller 916 and the PCI bus 918. The Ethernet interface, including controller 916 and the Ethernet connector, may support, 10BASE-T and 100BASE-TX Ethernet protocols, respectively. Via the Ethernet interface, the player tracking unit may communicate with remote servers,
10 remote player tracking units, remote gaming machines and other devices connected via the LAN 732 as described with respect to FIG. 7. In some embodiments, the player tracking unit may also communicate with a host gaming machine for the player tracking unit via the Ethernet interface. The board 900 may include one or more Ethernet ports to allow for Ethernet communications.

15 **[00156]** To allow for jitter free replay and for playback features, such as pause, fast forward, rewind and different playback speeds, digital video/audio files may also be buffered and/or stored in a memory device on or connected to the multimedia board 900. For instance, the compact flash memory 930 or a mass storage device connected via the IDE 1 port may be used to store and buffer digitally formatted video and audio
20 files. In this instance, the digital bit stream may be sent via the IDE bus 928 to the PCI bus 918 for processing by the audio/video decoder 914.

[00157] The NTSC/PAL decoder 910 is a video capture device for applications at the image port of the VGA controller. The decoder 910 may accept decoded signals from audio/video decoder 914 and analog signal from a TV or VCR source via the
25 video-in 912. In one embodiment, the multimedia board 900 may include or may be connected to a TV tuner (not shown) and/or an FM/AM radio tuner (not shown). Signals from the TV tuner may be processed by the NTSC/PAL decoder 910. Signals from the FM/AM radio tuner may be processed by the audio Codec (code and decode) 906.

30 **[00158]** The NTSC/PAL 910 decoder may be based on line-locked clock decoding and may be able to decode the PAL, SECAM and NTSC color signals into ITU 601 compatible color component values. It may accept analog inputs as CVBS from TV or VCR sources. Weak and distorted signals may be processed, too. An expansion port

(X-port) for digital video (bi-directional half duplex, D1 compatible) may be available to connect to the audio video decoder 914 or to a videophone Codec. At the image port (I-port) 8 or 16-bit wide output data with auxiliary reference data for interfacing to VGA controllers are supported. One application for the decoder 910 may be to capture and scale video images, which are provided as digital video stream through the image port of a VGA controller, for display via VGA's frame buffer, or for capture to system memory.

[00159] The multimedia board 900 may include an audio Codec 906 (code and decode) for processing audio signals received via an audio port 923 (aux, microphone, in and out in connector 922) and via the digital to analog converter 908 which is connected to the audio/video decoder 914. The audio port 923 may have the following features: 1) AC97/AMC97 Rev2 compliant, 2) 3D Sound circuitry, 3) high quality sample Rate conversion (SRC) from 4kHz to 48kHz in 1Hz increments, AUX in L/R (for CD/DVD), line out L/R. The audio Codec 906 may output signals via the audio port 923 to a sound projection device, such as speakers located on the player tracking unit, speakers located on the gaming machine or a headphone interface. The audio Codec 906 (see FIG. 10) may process signals input from a microphone connected to the player tracking unit, such as for voice recognition applications, as described with respect to FIGs. 2A, 2C and 3. Further, the audio Codec 906 may process audio signals input from an external device, such as an MP3 player or a memory stick that may be connected to the player tracking unit via an input interface on the player tracking unit.

[00160] The PCI bus interface in CPU 902 in communication with the PCI bus 918 may have, as an example, the following characteristics: 1) wake-up capability, 2) 32-bit data path, up to 33 MHz, 3) fixed priority and 4) 3.3V signal support. The PCI bus may be accessed via the external PCI connector on connector 922. The PCI bus 918 or a graphics interface (not shown) may allow a video graphics card to be connected to the motherboard for additional graphics processing power. The video graphics card may include additional memory and a co-processor for performing graphical operations.

[00161] The Sub-ISA bus interface in CPU 902 in communication with the sub-ISA bus 925, as an example, may have the following characteristics: 1) 16 MB addressing, 2) support for up to two chip selects for external I/O devices, 3) 8-bit

(optional 16-bit) data bus width. The sub-ISA bus 924 is externally accessible via the ISA bus connector in connector 934. A flash bios 926 for the multimedia board may be connected to the sub-ISA bus 925. The flash bios may store information, such as but not limited to 1) identification of devices on the multimedia board, 2) identification information for the board 900 which may be used to register the player tracking device with one or more external servers, 3) boot instructions, 4) download software instructions, 5) authentication instructions and data (e.g., encryption key), 6) device drivers and 7) configuration information.

[00162] The I2C bus 920 connected to the access bus in CPU 902 may be accessible via two I2C ports in connector 922. The two I2C bus interface ports are configurable either as a bus master or slave. They can maintain bi-directional communication with both multiple master and slave devices.

[00163] Three independent USB ports may be available on the board 900. These ports are externally accessible via the USB1, USB2 and USB3 ports in connector 934. Different boards may provide additional USB ports. Also, USB expansion ports may be connected to one or more of the USB ports. The present invention is not limited to a USB compatible connectors and protocols. For instance, IEEE1394 compatible connectors/protocols and FireWire compatible connectors/protocols may also be used. Details of using standard peripheral communication connections that may be used with the present invention are described in U.S. patent No.6,251,014, issued June 26, 2001, by Stockdale, et al., entitled, "Standard Peripheral Communication," previously incorporated herein.

[00164] The three USB ports may be open host controller interface 1.0 (OpenHCI) compliant. The OpenHCI specification provides a register-level description for a host controller, as well as common industry hardware/software interface and drivers. The multimedia board includes external connections in connector 934 for two serial communication ports (COM1 and COM2). The two serial ports are connected to the UART1 (Universal Asynchronous Receiver/Transmitter) and UART2 in CPU 902 respectively. The serial communication ports may be 16550A compatible. External drivers may be necessary to convert the signals for interfaces like RS232, RS485 or RS422. The USB and COM serial ports may be used to connect to devices such as a card reader, bar-coder reader, RFID reader, a smart card reader, a key pad and a master gaming controller on a gaming machine.

[00165] The multimedia board includes a wireless interface, shown as IrDA on connector 934, that allows for wireless communications with various devices, such as the remote control device 818 in FIG. 8. In one embodiment, the wireless interface may be an Infrared (IR) port. The IR port may be IrDA compatible, support Sharp-IR options ASK-IR and DASK-IR, support Consumer Remote Control supports RC-5, RC-6, NEC, RCA and RECS80.

[00166] The IR port may be used as an additional serial port for wireless communications. The communication may be with a device such as with a hand-held personal digital assistant (PDA). The port may support various communications rates depending on the data standard that is used. For instance, a data rate of up to 115.2 Kbps with HP-SIR, a data rate of 1.152 Mbps with MIR and a data rate of 4.0 Mbps with FIR, may be obtained.

[00167] The CPU 902 may include a real-time clock. The clock may include features such as 1) DS1287, MC146818 and PC87911 compatibility, 2) a multi-century calendar and 3) a battery back up. The CPU 902 may include logic for power management called a core logic module. The core logic module may be ACPI 1.0 (Advanced Control and Power Interface) compliant. The module may offer the following features: 1) automated CPU Suspend modulation, I/O Traps and Idle Timers for peripheral power management, 3) software SMI and Stop Clock for APM support and ACPI-compliant timer and register set. The power supply for the board 900 may be 5 VDC and other voltage may be generated on board.

[00168] The CPU 902 may execute an operating system that is used to load player tracking software modules into SDRAM 904 for execution by the CPU 902. Via the Ethernet interface, software upgrades for both the player tracking unit and also the host gaming machine may be downloaded to the player tracking unit. The player tracking software may use a modular software architecture with well defined API's. Details of the player tracking software architecture are described with respect to FIG. 11.

[00169] FIGURE 10 is a block diagram of components of a player tracking unit of the present invention integrated with a multimedia board 900 described with respect to FIG. 9. The connection scheme and the number and type of devices are for illustrative purpose only. Different combinations of devices may be configured with player tracking devices of the present invention and is not limited to the combination

in FIG. 10. For instance, in some player tracking units, the card reader 225 may be replaced with a bar-code reader or a bar-code reader may be included in addition to the card reader 225. Further, different connection schemes may be employed. For instance, the touch screen 814 is shown connected via the ISA bus connector in connector 934. The other embodiments, the touch screen 814 may be connected via the PCI bus interface, one of the USB ports or one of the communication ports (COM1 or COM2).

[00170] In FIG. 10, a custom hardware interface 954 is used to connect door switches 954, a touch screen 814 and light panel 216 to the board 900 via the ISA BUS. A mass storage device 316 is connected to the board 900 via the IDE connector. The mass storage device 316, which in this example is a read-write capable hard-drive, may be used as a video/audio cache 940 and a data cache 942. As described with respect to FIG. 9, the board 900 may also include compact flash memory that may also be used as a video cache and a data cache.

[00171] The display device 215 in this example is an LCD and is connected via the LCD port. The present invention may employ a variety of displays, which may require connections through a different port, such as the VGA port. The size of the display may be varied with the present invention. Displays that range from 4" diameter to a 15" diameter may be used.

[00172] A wireless interface 264 is connected to the IrDA port. The wireless interface may allow communication with a wireless device such as a TV style remote 818 for controlling audio and video features on the player tracking unit (see FIG. 8) or a portable wireless device, such as a player wireless interface 602, a host wireless interface 604 or a service wireless interface 606 as described with respect to FIG. 6. As described with respect to FIG. 9, the IrDA port may support a number of infrared standards and is not limited to IrDA.

[00173] The player tracking controller on the multimedia board (hardware and software used to control the functions of the player tracking unit) may communicate with the master gaming controller on the host gaming machine via the communication port, COM1. In other embodiments, the player tracking unit may communicate with the master gaming controller via a USB or Ethernet connection. Typically, a player tracking unit is integrated into the host gaming machine. A signal converter 947 may be used to convert serial signals from the multimedia board to a physical format

accepted by the gaming machine, such as RS-232. The physical signal formats used by different gaming machines may vary from manufacturer to manufacturer and between different models of the same manufacturer.

5 **[00174]** The card reader 225 and the key pad 220 are connected to the board via the two USB ports, USB2 and USB3. The microphone 207 is connected to the microphone input port, MIC. An external audio source 946, such as a portable music player, is connected to the player tracking unit via the line in port. One or more sound projection devices located on the player tracking unit, such as speaker 209 and/or the host gaming machine receive audio signals from the line out port on the board 900.

10 The line out port may also be used to provide a signal to a headphone jack 944 located on the player tracking unit. Via the headphone jack, a user of the player tracking unit may receive audio output via headphones that may be connected to the unit.

15 **[00175]** The Ethernet port may be used to connect the player tracking unit to a local area network. The player tracking unit may communicate with devices connected to the local area network, such as the external servers 950. The external servers 950 may include but are not limited to a player tracking/accounting server, a cashless system server and remote servers providing entertainment content. The player tracking unit may also be able to communicate with other devices connected to the local area network via the Ethernet port, such as, but not limited to other player

20 tracking units, other gaming machines and data collection units (DCUs) (see FIG. 1).

25 **[00176]** FIGURE 11 is a block diagram of a software architecture 1000 for a player tracking unit of the present invention. The player tracking software is configured in a modular manner. The modular architecture may allow different components of the player tracking software to be upgraded and bugs to be fixed by replacing only affected components via a download from a remote server. In addition, the supported features in the player tracking unit may be upgraded by downloading new application software 1008 or upgrading existing application software on the unit.

30 **[00177]** The functions of the player tracking unit may be controlled by the controller module 1001. The controller module 1001 may utilize an operating system to schedule and prioritize tasks executed by the multimedia board including loading software into RAM for execution. The applications 1008 are examples of playing tracking software that may be loaded into RAM for execution by the controller module 1001. The controller module 1001 may send information to the other software

modules, such as a gaming machine interface module 1002, a host proxy module 1003, a user interface 1005 and the various applications 1008 and receive information from these software modules. The different software modules may communicate with the controller module 1001 and each other via well-defined application program
5 interfaces (APIs).

[00178] The gaming machine interface module 1002 may include logic for communicating with gaming machines using different proprietary communication protocols and non-proprietary communication protocols as was described with respect to FIG. 3. The gaming machine interface module 1002 may be used to send data to the
10 host gaming machine and receive data from the host gaming machine. The data received from the gaming machine may include gaming information, such as, gaming machine identification information, gaming machine software information, gaming machine status information and metering information on the gaming machine. The player tracking unit may be able to download software to the gaming machine via the
15 gaming machine interface module 1002.

[00179] The host proxy module 1003 may be used to manage communications between the player tracking unit and gaming devices that may communicate with the player tracking unit via local area network. The gaming devices may include but are not limited to remote servers, other player tracking units, remote gaming machines
20 and data collection units. The communications with different devices may be enabled by a plurality of network interface modules 1004. The network interface modules may allow the player tracking unit to communicate using communication protocols required by different gaming devices. For instance, player tracking/accounting servers from different manufacturers may use different communication protocols as described
25 with respect to Fig. 3.

[00180] The controller module 1001 may execute a number of player tracking applications 1008. A number of player tracking applications 314 have been described with respect to FIGs. 1-6. In other embodiments, the controller module 1001 may include logic for automatically registering and deregistering the player tracking unit
30 and/or the host gaming machine with one or more remote servers, such as a player tracking accounting server. Before the player tracking unit beginning communications with a remote server, the remote server typically requires information used to recognize player tracking unit and the host gaming machine. Traditionally,

information needed by a remote server to recognize a particular gaming machine has been entered into the remote server in a manual process. For instance, at the gaming machine, a first technician may obtain and write down on a piece of paper the required information needed by the remote server to recognize the gaming machine and give the information to a second technician. After receiving the information, the second technician may manually enter, such as via a keyboard, the information on the paper into the remote server. If the second technician has correctly entered the information, then when the gaming machine is powered-up, communications may be established between the gaming machine and the remote server via the player tracking unit. In present invention, the registration logic 1007 executed by the controller module 1001 may be used to automatically transfer the information required for registration to one or more remote servers. Details of the registration and deregistration method are described with respect to FIGs. 12 and 13.

[00181] In another embodiment, the controller module 1001 may execute one or more software applications allowing the player tracking unit to perform software maintenance. The software maintenance application 1024 may allow the controller module 1001 to determine versions software of currently in-use on the player tracking unit, login into a remote server and compare the versions of software with software versions available on the remote server and determine when an upgrade is needed. The software may be upgraded to fix errors and/or to add new features. When the controller module has determined an upgrade is needed the player tracking unit may be capable of downloading one or more software modules and automatically installing the software on the player tracking unit. The software maintenance may be triggered in response to many factors, such as but not limited to 1) in response to a time factor monitored by the player unit, such as checking for upgrades once a month or once a week, 2) in response to a command received from a remote server or 3) in response to an input received at the player tracking unit. The input received at the player tracking unit may be generated by an operator.

[00182] In another embodiment, the player tracking unit may not only perform software maintenance for the player tracking unit but also for the host gaming machine. Thus, the player tracking unit may survey software that is being used on the host gaming machine, compare the software being used on the gaming machine with software available on a remote server and download software for installation on the

gaming machine. The player tracking unit may store the downloaded software to a mass storage device, such as a hard drive. Thus, the hard drive may serve as a temporary cache for gaming machine software.

5 [00183] The player tracking unit may notify the gaming machine that it has downloaded the software that is available for installation on the gaming machine and the reason for the upgrade. The gaming machine may notify the player tracking unit when it is ready to receive the software. When the player tracking unit receives the software request from the gaming machine, the player tracking unit may download the software to the gaming machine. When the player tracking unit or the gaming
10 machine has successfully received and/or installed new software, they may notify the remote server that sent the software of the successful reception and/or installation of the software. An advantage of using the player tracking unit as a temporary cache for gaming machine software is that it may prevent performance degradation of the gaming machine resulting from large data transfers.

15 [00184] In other embodiments, the controller module 1001 may control a number of applications that utilize the multimedia capabilities of the player tracking unit. The entertainment application 1020 may be used to generate menus of available entertainment selections that are available for presentation on the player tracking unit. The entertainment selections may include but are not limited to live broadcast events
20 (e.g., sporting events, boxing, horse racing, news), time-shifted programs, video-on-demand (e.g., movies and pay-per-view), TV/Cable programming, live video cams (e.g., a video feed of the casino floor, the Las Vegas strip, a show being performed at the casino, etc.) and audio selections (e.g., a music jukebox).

[00185] The entertainment selections available for viewing may change with time.
25 For instance, the controller module 1001 may receive regular updates of available entertainment selections from one or more remote servers via the network interface modules 1004 and the host proxy module 1003 and may update the menus that may be displayed on the unit. In one embodiment, a player may be able to customize their video and audio selection menus. For example, the player may be able to select
30 favorite sports teams, favorite TV shows, favorite music selections or favorite music categories. When a player registers at the player tracking unit (inputs identification information, the entertainment preference information for an individual player may be

retrieved by the controller module 1001 from a remote server and used to generate custom entertainment selection menus for the player.

5 **[00186]** The controller module 1001 may control output entertainment menus using the user interface software 1005. Via the user interface software 1005, which may include logic for defining the hardware-software interface and logic for controlling various hardware devices, the controller module 1001 may be able to display the menus to a display on the player tracking unit and receive entertainment selections via one or more internal or external input devices, such as a touch screen or a hand-held remote as described with respect to FIG. 8.

10 **[00187]** When the player tracking unit has received an input requesting an entertainment selection, the controller module may launch an second application that allows the entertainment selection to be presented on the user interface, such as but not limited to a video player 1010, an audio player 1012 and a web-browser 1014. These applications may accept inputs from the user interface that are used to operate features
15 of the application. For example, during playback, the video player may accept inputs for playing, forwarding, rewinding, pausing, stopping, increasing/decreasing the volume and slow motion of a video feature being played by the video player. The inputs may be generated from a remote input device, such as a remote control or a local input device, such as input buttons on the player tracking unit or a touch screen on the
20 display of the player tracking unit.

[00188] In yet another embodiment, the controller module 1001 may control promotion software 1022 that presents various promotional features on the user interface of the player tracking unit. The promotional features may utilize the multimedia capabilities of the player tracking unit, such as video and audio
25 presentations via the user interface on the player tracking unit. The promotional features may include 1) attraction presentations to attract a player to the gaming machine, 2) advertising for various casino services, 3) promotional awards, such as a bonus award on a gaming machine, promotional credits for game play, and coupons for casino services, such as discounted or free food and entertainment.

30 **[00189]** The promotional activities presented on the player tracking unit may be selected based upon game play activity on the gaming machine. For instance, certain promotions may be offered to a player based on how long they have been playing on a particular machine, how much they have wagered and how much they have won.

Further, the promotional activities may be selected for a particular user using demographic information obtained from the user, such as information input using a player tracking card.

5 [00190] The promotion and attraction presentations and a schedule for promotions/attraction may be regularly updated via downloads from a remote server. The promotion and attraction presentations may be updated to reflect different events throughout the year. For instance, during holiday periods, the graphics and sound used in the video and audio portions of advertising, attraction features or promotions presented on the player tracking unit may reflect holiday themes or seasonal themes, 10 such as but not limited to leprechauns and clovers with Irish music around St. Patrick's day, patriotic symbols and music around 4th of July and Halloween symbols and music around Halloween.

[00191] In another embodiment, advertising, promotions and attraction features may be based upon player identification information for a player at the gaming 15 machine. For example, a player may be offered a special promotion or a special attraction feature may be played for the player on the day of their birthday or around the time of their birthday. As another example, special promotions or special attraction features may be played for players that are considered highly valuable to the casino. As another example, if a picture is available of the player, the picture may be 20 integrated into an attract feature tailored to the player. The player identification information may be obtained from the player via a loyalty program, such as player tracking club. When the player initiates a player tracking session on the gaming machine, identification information about the player can be obtained and used to tailor specific promotions and attract features to the player at the gaming machine.

25 [00192] In another embodiment, a number of different gaming activities may be enabled via gaming software executed on the gaming machine. These gaming activities include but are not limited to: 1) a game of chance played on the player tracking unit, 2) a sports book for wagering on sporting events that may be viewed with the player tracking unit, 3) bonus games, 4) progressive games and 5) linked 30 games including cooperative games and tournament games. The gaming applications on the player tracking may be independent of the gaming activity played on the host gaming machine or linked to the gaming activities on gaming machine. For instance, a bonus game played on the gaming machine may be triggered as a result of gaming

events on the gaming machine, such as but not limited, an amount of money wagered on the gaming machine in a game play session or a bonus game may be triggered independently of game activity, such as at random.

[00193] The player tracking unit may be used to support linked game applications.

5 For instance, during a tournament, a user may be able to view a status board for the participants playing in the tournament, such as leader board via the player tracking display or hear status information for the tournament. In a cooperative game, the user may be able to view or hear status information for the cooperative game via the player tracking interface. In one embodiment, in a cooperative game, a group of player's on
10 different gaming machines may try to gather a number of items in a treasure hunt via game play on each of their respective host gaming machines. The progress of the group of player's, such as the number of items found for the group and items needed by the group may be displayed on the player tracking unit.

[00194] Peer-to-peer communication between different player tracking units may
15 allow different groups of player tracking units to be linked and unlinked for cooperative or competitive game play. For instance, a user on one gaming machine may send out a message to a group of other gaming machines asking whether anyone wishes to join in a competitive or cooperative game or messages for cooperative or competitive linked games may be sent out regularly from a remote server. Once a
20 group of player's has elected to join in a linked game, their gaming machines may be linked together via peer-to-peer communications between the player tracking units on the gaming machines. After the linked game is over, the player tracking units gaming machines may end the link allowing for different groups to form and break-up over time.

25 **[00195]** In another embodiment, the controller module 1001 may execute messaging software 1016 that allows messages to be sent from one player tracking unit to another player tracking unit. The messaging software may allow a user at a first gaming machine to request communications with another user at a second gaming machine via the player tracking units on each of the gaming machines. After,
30 the messaging software 1016 may be able to determine whether the requested user is currently registered with another gaming machine on the player tracking network via the gaming machine's player tracking unit. For instance, in one embodiment, the messaging software may contact a remote server or router that tracks user activity on

different gaming machines and can match a user to a particular player tracking unit. In another embodiment, the messaging software 1016 may broadcast a message to the other player tracking units connected to a local area network requesting communications with the requested user that may be registered at one of the player tracking units on the network.

[00196] When the requested user is located at a second player tracking unit, the first player tracking unit requesting the communications may establish a peer-to-peer communication link with the second player tracking unit. Then, the users at the two player tracking units may communicate with one another directly. The messages may be in different formats such as text, voice, video and combinations thereof. The text, voice and video formats may utilize the multimedia capabilities of the player tracking unit including the multimedia board, display, microphone, sound projection devices and input devices. At the end of the communication session, the peer-to-peer link is terminated between the player tracking units. In the present invention, peer-to-peer message communications is not limited to communications between two player tracking units. Peer-to-peer message communications may be generated three or more player tracking units to allow "conference" type communications between different groups of player tracking units.

[00197] Peer-to-peer communications may also be used to allow groups of player tracking units to simultaneously present common multimedia functions. For instance, two or more players may wish to watch the same "sporting event" and send messages to each other about the game while they are playing the gaming machine. Using the peer-to-peer link on the player tracking unit, the communication link and the simultaneous broadcast of the sporting events may be coordinated between the player tracking units. In another embodiment, two or more players may desire to listen to the same music while they are playing the gaming machine and even trade musical selections. Using the peer-to-peer communication link, two or more player tracking units may be able to share musical (including music videos) and video selections for play on one or both of the player tracking units.

[00198] In yet another embodiment, peer-to-peer communications may be used to share contents between other player tracking units and gaming machines in the peer-to-peer network. For instance, when a first player tracking unit receives a request for a video program, the first player tracking unit may attempt to locate the requested

program on a nearby player tracking unit. When a nearby player tracking unit has the requested program, the first player tracking unit may establish a peer-to-peer communication link the nearby player tracking unit and download the requested program from the nearby player tracking unit. The peer-to-peer transfer may provide a
5 faster download then from a remote server and may lessen the bandwidth used on the local area network.

[00199] FIGURE 12 is a flow chart of a method 1100 of registering a gaming machine using a player tracking unit of the present invention to one or more servers in communication with the player tracking unit. The registration process may be referred
10 as auto-provisioning. In the present invention, the player tracking unit and the host gaming machine may be registered as a single entity or the player tracking unit and the host gaming machine may be registered as separate entities. When the player tracking unit is registered separately from the gaming machine, additional information identifying the player tracking unit may be sent to the local servers in 1130.

[00200] In 1105, the player tracking unit is powered-up and may perform a variety of self checks. Typically, the player tracking unit receives power from its host gaming machine. However, the power supply may be independent (unswitched) of the gaming machine power supply and the player tracking unit may remain with power even when the gaming machine power is off. The player tracking unit and the gaming machine
20 may be powered-up at the same time. The gaming machine and the player tracking unit may be powered-up together for a number of reasons, such as after it has been moved, after maintenance, after a power-failure or hardware failure and during initial installation.

[00201] In 1110, after the player tracking determines it is operating properly, it
25 may establish a network connection, retrieve a date and a time data from a network time protocol server and set an internal clock on the player tracking unit (see description of FIG. 9) using the retrieved time and date. The date and the time provided by the network time protocol server may be used in the communication process between the player tracking unit and other network devices.

[00202] In 1115, the player tracking controller on the player tracking unit may establish communications with the master gaming controller on its host gaming machine. In 1120, again for communication purposes, the player tracking unit and the master gaming controller may synchronize clocks using the time and date retrieved
30

from the network time protocol server. In 1125, the player tracking unit may receive gaming machine identification information from the host gaming machine. The information transfer may be initiated by the gaming machine or the player tracking unit.

5 **[00203]** In 1130, a registration message is sent to one or more local servers on the local area network that may communicate with the player tracking unit and/or the host gaming machine. The registration message may include but is not limited to 1) a request to register with the server for communication purposes. The registration message 1) a time and a date, 2) gaming machine identification information, 3) player
10 tracking unit identification information and 4) a registration purpose (installation, power failure, machine movement, maintenance, etc). When the registration process has been initiated by an operator at the host gaming machine, the identification information may include operator identification information.

15 **[00204]** Depending on the registration purpose, different information may be sent to the host server. For instance, for a power-failure, the time and date of the power-failure may be sent to the host server. For security, this information may be compared with other records maintained by the server. As another example, a machine has been moved, its new location and old location may be sent to the server and compared with records of a movement schedule and previous records for the location of the gaming
20 machine.

25 **[00205]** The communications between the player tracking unit and other devices on the network, such as during the registration process, may employ various security protocols and identification schemes including encryption to ensure secure and authenticated communications. Details of secure communication methods that may be employed with the present invention are described in co-pending U.S. application 09/732,650, filed December 7, 2000 and titled, "Secure Virtual Networks in a Gaming Machine and co-pending U.S. application no. 10/116,424, filed April 3, 2002, titled, "Secure Virtual Networks in a Gaming machine," each of which is incorporated herein in their entirety and for all purposes.

30 **[00206]** In 1135, the player tracking unit may receive a reply from each of the one or more local servers and determine its login status for the host gaming machine and/or the player tracking unit. In 1140, when the gaming machine does not have authorization from a server, the player tracking may send a message to the gaming

machine indicating that it does not have authorization and any possible reasons for the failure. The gaming machine may receive the information and attempt to perform self-diagnostics. When the registration process is being initiated by an operator, the gaming machine may display the reason for the failure to an operator. In response, the operator may attempt to remedy the problem and retry the registration process.

[00207] In 1145, when the gaming machine and/or the player tracking unit has been authorized for communications with a particular server, the player tracking unit and/or the gaming machine may begin normal communications with the server that has approved device. In one embodiment, a registration server may be used to authorize communications between a plurality of servers and the player tracking unit requesting an authorized communication connection. For instance, the registration server may authorize communications between the player tracking unit and its host gaming machine with a player tracking/accounting server, a cashless system server and a progressive. As noted above, the registration process may be carried out with each server individually. The authorization server may also be used to track communication requests between different devices, such as for peer-to-peer communications between different player tracking units and authorize peer-to-peer communications on the network.

[00208] In another embodiment, a single registration server, such as a floor control server, may be used as a player tracking unit registration site for all of the player tracking units in the player tracking system. Application servers, such as, a cashless system server, a gaming software server and a player tracking accounting server, may also register with the registration server. Thus, the registration server may act as a central registration agency and route messages to appropriate applications provided by the application servers. An advantage of this approach is that a new server providing a new application or an old server providing a new application may be added to the system without requiring all of the player tracking units to register with the server supplying the new application. Instead, the server with the new application may only have to register with the registration server and then the registration server will route messages for communications between the player tracking units and the newly registered application.

[00209] FIGURE 13 is a flow chart of a method 1200 of shutdown procedure (un-register) for a gaming machine with a player tracking unit of the present invention. In

the shutdown procedure, the gaming machine and player tracking unit are disconnected from one or more servers in communication with the player tracking unit. In a gaming machine without a player tracking unit but with a network connection, this procedure may be implemented by the master gaming controller on
5 the gaming machine. The shutdown procedure may be initiated for a number of reasons, such as but not limited to, prior to moving the gaming machine or bringing down the gaming machine power for maintenance.

[00210] In 1205, authorization information, such as identification information, is input into the gaming machine and received by the player tracking unit. The
10 identification information may be for the person and/or the device requesting the shutdown. The authorization information may be input via an interface on the gaming machine or an interface on the player tracking unit. When the identification information is input via an interface on the gaming machine, the gaming machine may transmit the identification information to the player tracking unit. After receiving the
15 identification information, the player tracking unit may send a message to a remote server with the identification message requesting authorization to begin a shutdown of the gaming machine. In 1210, the player tracking unit receives a reply message in regards to the shutdown request. The player tracking unit or master gaming controller may check the message to determine whether the requested shutdown has been
20 approved.

[00211] In 1210, when the requested shutdown request has been disapproved (e.g., the operator incorrectly entered their identification information or the identification information is invalid), the shutdown procedure is not allowed to continue. When the shutdown request has been approved, in 1215, the reason for initiating the shutdown
25 may be input. Next, in 1220, the shutdown procedure may be initiated.

[00212] In 1225, via the player tracking unit, a shutdown request message may be sent one or more servers via the local area network. The shutdown request message may include but is not limited to 1) gaming identification information, 2) date and time, 3) reason for the shutdown or disconnection from the network, 4) operator
30 identification information and 5) state data for the gaming machine. The state data may include but is not limited to metering data and contents of the gaming machine's non-volatile memory. After receiving the shutdown request message and examining its contents, each of the one or more servers may send a reply message indicating that

they have received a shutdown message and authorizing or not authorizing the shutdown request.

5 [00213] In 1230, the reply message is checked to determine whether the shutdown request has been authorized. When the shutdown request has been authorized, in 1235, the gaming machine operator may be notified via either the player tracking interface or the gaming machine interface, that shutdown request has been approved. Then, the operator, in 1260, may power-down the gaming machine and the player tracking unit. In other embodiments, the gaming machine and player tracking unit may be remotely powered down without intervention from the operator.

10 [00214] In 1240, when the shutdown request has not been approved, a status message indicating defects in the request may be displayed to an operator. In 1245, it is determined whether to retry to send the data and attempt to correct the defect. When a retry is attempted, the method returns to 1225. When a retry is not attempted, in 1255, a decision is made whether to power-down the gaming machine. When a power-down is not chosen, in 1265, the gaming machine may return to its previous state. When a power down is forced, in 1260, the power may be turned off. However, the player tracking unit, gaming machine and system server may log the abnormal shutdown by the operator that forced the shutdown.

20 [00215] In another embodiment, to automate the shutdown procedure/log-off procedure, a special single purpose card, such as smart card, magnetic striped card, or input device, such as a hand-held computer, that may interface with the player tracking unit may be programmed to implement the shutdown procedure. For instance, a smart card may be programmed with the shutdown command, authorization access data and the reason for the shutdown. Upon insertion of the smart card into a card reader on the player tracking unit, data may be uploaded and the logout may be commenced without further interrogation of the operator.

30 [00216] With reference to FIGURE 14, shown is a block diagram of an embodiment of a gaming system that provides access to Web content from a player tracking unit. In particular, a network including gaming machines 702 and 704 and various servers such as cache server 1414, promotional server 1416, and local Web server 1418, are linked to Web server 1402 through Internet 734. Communications to this network from the Internet pass through firewall 1408, which can include various

filters. Any number of clients or other components, such as 1404 and 1406, can also communicate Internet 734.

[00217] Gaming machines 702 and 704 can each include player tracking units 701 and 703, respectively. The player tracking units can each include a display and one or more input devices. The display can be an LCD display, a plasma display, a CRT, or the like. An input device included on a player tracking unit can be a touch screen interface, a wireless remote control in communication with the player tracking unit via a wireless interface, a key pad, selection buttons, an enter button, a microphone, or the like. In some applications, the input device can be a touch screen interface disposed between the player and the display. A player tracking unit can further include a player tracking controller that provides a Web browser. The Web browser can display web pages on the display of the player tracking unit. In some applications, the Web browser can include a scroll bar that allows a player to navigate through various portions of a Web page. Such scrolling functionality can be particularly useful on a small screen (i.e., on the order of about three inches in height), although various sizes of display screens can be used. Furthermore, the player tracking unit can include a processor that can digitally format program files, such as downloaded web pages, and the like, for output on the display.

[00218] In some embodiments, gaming machines 702 and 704 can also include peripheral devices such as sound projection devices, printers, and the like. More particularly, player tracking units 701 and 703 can include audio interfaces that can be used to connect with sound projection devices, such as speakers, headphones, and the like. Furthermore, printers can be included in gaming machines 702 and 704, which can be used to print content shown on a player tracking unit display. This content can be printed automatically upon a command from the gaming machine or other gaming device, or based on player input.

[00219] In the present embodiment, Web server 1402 can provide various types of content to gaming machines 702 and 704 via Internet 734. For instance, the content can include advertisements, game samples, games of chance, hotel information/reservations, show information/reservations, restaurant information/reservations, tourist information/reservations, and the like. For game samples and games of chance such as keno, bingo, video slots, video poker, etc., the Web content can be regulated by one or more gaming jurisdictions.

[00220] Before reaching the player tracking units 701 and 703, the Web content passes through a firewall 1408. The firewall 1408 can include various filters, depending on the application. For instance, content filter 1412 can limit access to certain Web sites. In particular, a gaming establishment may want to limit access to Web sites sponsored by or affiliated with the gaming establishment. Another type of filter that can be included with firewall 1408 includes access filter 1410. Such an access filter can limit access to content based on the identity of a player. For instance, certain groups of players, such as high rollers, or other preferred guests, may be entitled to access particular web sites that provide special offers, advertisements, services, and the like. Access to these particular individuals can be based on player identification number, status, or the like. Specifically, players given access to these web sites can have their player identification numbers included on a list in some embodiments. In other embodiments, player tracking cards or player identification numbers can be associated with particular status groups.

[00221] Yet another type of filter that can be used is a jurisdictional filter. Such a jurisdictional filter can be used to limit access to certain Web content, depending on the jurisdiction where the player tracking unit is located. Specifically, a jurisdictional filter can be configured to deny access to gaming content that is not permitted in the particular jurisdiction where the player tracking unit is located. For instance, some jurisdictions allow participation in games such as sports book, keno, and other gaming, while other jurisdictions limit gaming activities to games such as bingo, lottery, and the like. In addition, some jurisdictions do not permit gaming activities involving financial transactions over the Internet. Still other jurisdictions limit player losses to a particular dollar amount per day. Accordingly, jurisdictional filters can be implemented to limit access to certain gaming content according to where the player tracking unit is located. Furthermore, in those jurisdictions that limit player losses to a particular dollar amount per day, jurisdictional filters can be implemented that deny access to players who have reached a jurisdictional limit of losses. In some embodiments, when this limit is reached, a message can be provided to the player via the player tracking unit, such as "Time to go home. You have lost \$500 today."

[00222] With reference to FIGURE 15A, shown is a block diagram of an embodiment of a gaming machine with a network connection. In particular, gaming machine 1500 includes a player tracking unit 1502 and a processor or memory 1504.

The processor/memory 1504 can be a master gaming controller configured to present one or more games of chance, nonvolatile memory, or any other type of processor or memory. Network connection 1508 can provide the connection between player tracking unit 1502 and the Internet, various servers, and the like. Network connection
5 1508 can be an Ethernet connection, a token-ring connection, or the like. In addition, player tracking unit 1502 can be connected to processor/memory 1504 by connection 1506. Connection 1506 can be an Ethernet connection, a token ring connection, or the like.

[00223] With reference to FIGURE 15B, shown is a block diagram of a player
10 tracking unit with a Web browser. The player tracking unit 1502 can include a browser and can include communication board 1512, transcode device 1514, and display/audio output 1516. Information passing between the player tracking unit 1502 and network connection 1508 can pass through communication board 1512. Transcode device 1514 can be used to scale or adjust content received from an outside
15 source, such as a Web server or the like, to the output devices included in the player tracking unit 1502.

[00224] Further, the transcode device 1516 may be operable to scale or adjust content, such as multimedia content, to a remote gaming device coupled to the player tracking unit. For instance, the transcode device may be used to scale or adjust
20 multimedia content for output to a gaming machine coupled to the player tracking unit or to a hand-held device in wireless communications with the player tracking unit. The content that is transcoded by the player tracking unit 1502 may have been generated locally on the player tracking unit or received from a remote gaming device.

[00225] For instance, if the display 1516 has dimensions that differ from the
25 original content's parameters, then transcode device 1514 can scale the content in order to reduce distortion of the displayed content. Also, as described above, a scroll bar can be included on the display to allow a player to view images that are larger than the display size. More particularly, if a small display is used, there may be instances in which it is desirable to display content that is larger than the display area.
30 In such instances, the player can still view the content by using one or more scroll bars. In addition, if an audio device 1516 is used, content in the form of sound can be scaled by the transcode device 1514 to match the parameters of the audio device 1516.

[00226] In general, the transcode device 1516 may be designed or configured to consider a gaming device's, processor, storage and output capabilities when transcoding content. The output capabilities may include any output devices coupled to a target gaming device's output interface, such as but not limited to video output devices, audio output devices, light panels and printing devices. Prior to transcoding content for a remote gaming device, the player tracking unit 1502 may be operable to establish a communication session with the remote gaming device and request information regarding its processor, storage and output capabilities. In another embodiment, a remote gaming device may contact the player tracking unit and request content in a particular format. Based on the information included in a request, the player tracking unit may transcode content to format that satisfies at least a minimum set of requirements provided in the request.

[00227] In the present embodiment, the Web browser or a device associated with the player tracking device can provide various features, such as search functions, help functions, reminders, or the like. For instance, a search function can allow a player to search for various types of games, shows, restaurants, etc. using a search engine. Furthermore, in some examples, the search function can be personalized for a player such that the player can specify items or characteristics preferred in the searches. For instance, a player may specify a particular location or denomination for preferred games of chance, types and prices for preferred shows, or types of cuisines preferred for restaurants. When the player uses the search engine, the search results can be prioritized based on these specified items or characteristics, such that a list of search results includes preferred items or characteristics at or near the top of the list. In some examples, the search results can be prioritized based on items or characteristics specified by a gaming establishment. For instance, a gaming establishment may want to promote a new game, show, or restaurant. When a player uses the search engine, the results can be displayed with the game, show, restaurant, etc. specified by the gaming establishment included at or near the top of the list of search results. In addition, gaming establishments can keep track of searches conducted by players for player tracking and/or marketing analysis. For instance, gaming establishments can determine the types of information that are most often requested by players, such as requests for restaurants, and then cater their marketing or offerings to address these areas of interest.

[00228] In another example, a help function can allow a player to find information about the gaming machine, hotel, restaurants, events, etc. Specifically, the help function can include a list of items, a pop-up feature that appears when a cursor is placed over an item or when the item is otherwise selected, or the like, that provides
5 access to available information about the item. The help function may also include search capabilities that allow a player to search for help categories.

[00229] In yet another example, reminders can be provided to a player through the display/audio device 1516. The reminders can be global in nature, such as advertisements broadcasted through a web site shown on the display 1516, or they can
10 be local or personal. Local reminders can be provided to certain gaming machines, such as those associated with a particular gaming establishment. Personal reminders can be provided to a specific player based on a Web-based personal account or a player tracking account. The reminders can be provided by a Web server, as part of the player tracking unit/browser 1502 system, through the gaming machine, or other
15 servers, depending on the particular application.

[00230] The embodiments shown in Figs. 14-15B provide various benefits. In particular, by providing access to Web content from a player tracking unit, content providers can provide static or dynamic content efficiently at one web site, which can be accessed by Internet users, gaming machine players, etc. If changes are made to
20 the web site, all of these users will receive the updated information without the content provider needing to update various channels of communication, which can be costly and time-consuming. Furthermore, by providing a web browser and input devices on player tracking devices, the gaming machines can provide two-way communications between players and web servers or other content providers.
25 Accordingly, players can specify the type of content they wish to view and gaming establishments can communicate with the players. In addition, with the use of filters, gaming establishments can participate in harm minimization by denying access to web sites that contain games of chance that are not permitted in a particular jurisdiction, and in some applications, by providing a message when a player has
30 reached a certain limit of losses for the gaming period.

[00231] Although the embodiments shown in Figs. 14-15B depict a particular configuration of gaming machines and gaming machine components, it should be recognized that modifications can be made within the scope of the present invention.

For instance, although Fig. 14 includes two gaming machines, two clients, etc., any number of gaming machines, servers, and other components can be included in the gaming system. Furthermore, although Figs. 15A-B include a particular configuration of components within a gaming machine or player tracking device, various
5 processors, memory, and other components can be included in the gaming machines and player tracking units within the scope of the present invention.

Conclusion

[00232] Although the foregoing embodiments have been described in some detail for purposes of clarity of understanding, it will be apparent that certain changes and
10 modifications may be practiced within the scope of the appended claims. For instance, while the gaming machines of this invention have been depicted as upright models having top box mounted on top of the main gaming machine cabinet, the use of gaming devices in accordance with this invention is not so limited. For example, gaming machine may be provided without a top box or the gaming machine may be of
15 a slant-top or table top design.

CLAIMS

What is claimed is:

1. A player tracking unit comprising:
a display;
5 a player tracking controller designed or configured to a) to track wagering activity on a gaming machine providing wagering on a game of chance and b) to provide a web-browser on the display, wherein the web-browser is configured to display web pages on the display;
one or more input devices configured to receive selections associated with the
10 web-browser;
a multimedia board for processing digitally formatted program files for output on the display; and
a communication board for communicating with remote gaming devices including a web server.
15
2. The player tracking unit of claim 1, further comprising an audio interface for connecting to one or more sound projection devices.
3. The player tracking unit of claim 1, wherein the one or more input devices are
20 selected from the group consisting of: a touch screen interface, a wireless remote control in communication with the player tracking unit via a wireless interface, a key pad, selection buttons, an enter button, a microphone.
4. The player tracking unit of claim 1, further comprising a touch screen
25 interface over the display.
5. The player tracking unit of claim 1, wherein the web browser can access content on the web server to display on the web pages, wherein the content is selected from the group consisting of advertisements, game samples, games of chance, hotel
30 information/reservations, show information/reservations, restaurant information/reservations, and tourist information/reservations.

6. The player tracking unit of claim 1, wherein the player tracking unit is operable to display a menu of games of chance available for play on the gaming machine or the player tracking unit as one of the web pages.
- 5 7. The player tracking unit of claim 1, further comprising a content filter, wherein the content filter is configured to limit access to certain web sites through the web browser and display.
8. The player tracking unit of claim 1, further comprising an access filter,
10 wherein the access filter is configured to limit access to certain web content to specified players.
9. The player tracking unit of claim 8, wherein the access filter is configured to
15 limit access based on player identification number, status, or both identification number and status.
10. The player tracking unit of claim 1, further comprising a jurisdictional filter configured to limit access to particular content in various jurisdictions.
- 20 11. The player tracking unit of claim 10, wherein the jurisdictional filter is configured to deny access to gaming content that is not permitted in the jurisdiction where the player tracking unit is located.
12. The player tracking unit of claim 10, wherein the jurisdiction filter is
25 configured to deny access to gaming content based upon jurisdictional limits on bet amounts.
13. The player tracking unit of claim 1, wherein the player tracking unit provides two-way communications between a player and a website.
30
14. The player tracking unit of claim 13, wherein the player can select web sites and information for display.

15. The player tracking unit of claim 13, wherein the player tracking unit provides a scroll bar that allows the player to view desired portions of content on the display.
16. The player tracking unit of claim 1, wherein the multimedia board includes
5 transcode capabilities configured to adapt multimedia content, including video and audio content that is configured for a first gaming device with first processing, first storage and first output capabilities, to a second gaming device with second processing, second storage and second output capabilities for the multimedia content.
- 10 17. The player tracking unit of claim 16, wherein the first gaming device or the second gaming device are one or more of the gaming machine, the player tracking unit or a portable gaming device.
18. The player tracking unit of claim 16, wherein the player tracking unit is further
15 designed or configured to send transcoded multimedia content to a remote gaming device.
19. The player tracking unit of claim 18, wherein prior to sending the transcoded multimedia content to the remote gaming device, the player tracking unit is operable
20 to determine one or more of the processing, storage and output capabilities of the remote gaming device for use in transcoding the multimedia content.
20. The player tracking unit of claim 16, wherein the second output capabilities of the second gaming device depend on properties of video or audio output devices
25 coupled to the second gaming device.
21. The player tracking unit of claim 16, wherein the display on the player tracking unit provides less resolution than a main display used to present the game of chance on the gaming machine and wherein the transcode capabilities allow video
30 gaming content configured for a first resolution of the main display to be scaled to a second resolution of the display.
22. The player tracking unit of claim 21, wherein the gaming content is a game of chance or a bonus game available for play on the gaming machine.

23. The player tracking unit of claim 16, wherein the display on the player tracking unit provides less resolution than a main display used to present the game of chance on the gaming machine and wherein the transcode capabilities allow gaming content configured for a first resolution of the display to be scaled to a second resolution of the main display.

24. The player tracking unit of claim 1, further comprising an Ethernet connection between the player tracking unit and a web server.

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25. The player tracking unit of claim 1, further comprising an Ethernet connection between the player tracking unit and a master gaming controller configured to present a game of chance on a gaming machine.

26. The player tracking unit of claim 1, further comprising a printer configured to print content displayed on the display.

27. The player tracking unit of claim 1, wherein the web browser is configured to provide a search tool, a help tool, or both a search tool and help tool.

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28. The player tracking unit of claim 1, wherein the search tool allows a search for games of chance that can be played on the gaming machine or the player tracking unit.

29. The player tracking unit of claim 1, wherein the player tracking controller is configured to provide reminders based on information stored in a player tracking account.

30. The player tracking unit of claim 1, wherein the multimedia board is capable of processing programs received by the player tracking unit in a streaming format.

30

31. The player tracking unit of claim 1, further comprising:
a network interface.

32. The player tracking unit of claim 1, wherein the multimedia board further comprises at least one of an Ethernet interface, a digital audio/video decoder, an NTSC/PAL decoder, a video output interface, a video input interface, a USB interface, a PCI interface, an IDE interface, an ISA interface, a CPU, a graphics card,
5 a USB interface, a wireless interface, an audio output interface, an audio input interface, an audio codec (coder/decoder), a microphone input interface, a memory interface and combinations thereof.
33. The player tracking unit of claim 1, wherein the display is at least one of a
10 LCD display, a plasma display, and a CRT.
34. The player tracking unit of claim 1, further comprising: a non-volatile memory for storing critical information.
- 15 35. The player tracking unit of claim 34, wherein the player tracking controller is further designed or configured to detect a tilt event on the player tracking unit and store the critical information to the non-volatile memory before the critical information is lost.
- 20 36. The player tracking unit of claim 35, wherein the tilt event is a loss of power.
37. The player tracking unit of claim 34, wherein the critical information is one or more of a snap shot of a web page displayed on the display, a video image displayed on the display, game content displayed on the display, transactional information
25 displayed on the display or combinations thereof.
38. The player tracking unit of claim 34, wherein the player tracking controller is designed or configured to determine the critical information to store in the non-volatile memory.
30
39. The player tracking unit of claim 34, wherein the player tracking controller is further designed or configured to retrieve a selected portion of the critical information from the non-volatile memory and to display the selected portion of the critical

information on the display or send the selected portion of the critical information to a remote gaming device.

5 40. The player tracking unit of claim 34, wherein the player tracking unit is further designed or configured to generate an interface on the display for selecting critical information stored in the non-volatile for retrieval.

10 41. The player tracking unit of claim 34, wherein the player tracking unit is further designed or configured to reconstruct a video image from a previous state of the player tracking unit displayed on the display using the critical information stored on the gaming machine.

15 42. The player tracking unit of claim 41, wherein the reconstructed video image is from a game, a bonus game or a transaction interface generated on the player tracking unit.

20 43. The player tracking unit of claim 34, wherein the player tracking unit is further designed or configured to store a video image from a previous state of the player tracking unit to the non-volatile memory.

44. The player tracking unit of claim 43, wherein the video image is from a game, a bonus game or a transaction interface generated on the player tracking unit.

25 45. The player tracking unit of claim 34, wherein the critical information is from a game, a bonus game or a transaction generated on the player tracking unit.

30 46. The player tracking unit of claim 34, wherein, during operation of player tracking unit, the player tracking controller advances between a plurality of states and stores the state information for each of the plurality of states to the non-volatile memory and wherein when a malfunction occurs between a first state and a second state in the plurality of states the player tracking unit is operable to restore itself to the first state using the state information for the first state stored in the non-volatile memory.

47. A gaming machine comprising:

a master gaming controller designed or configured to present one or more games of chance played on the gaming machine; and

a player tracking unit comprising:

5 a display;

a player tracking controller designed or configured to provide a web-browser on the display, wherein the web-browser is configured to display web pages on the display;

10 one or more input devices configured to receive selections associated with the web-browser; and

a multimedia board for processing digitally formatted program files for output on the display.

48. A player tracking unit comprising:

15 a display;

a player tracking controller designed or configured to a) to track wagering activity on a gaming machine providing wagering on a game of chance and b) advance between a plurality of states and stores the state information for each of the plurality of states to a non-volatile memory wherein when a malfunction occurs
20 between a first state and a second state in the plurality of states the player tracking unit is operable to restore itself to the first state using the state information for the first state stored in the non-volatile memory;

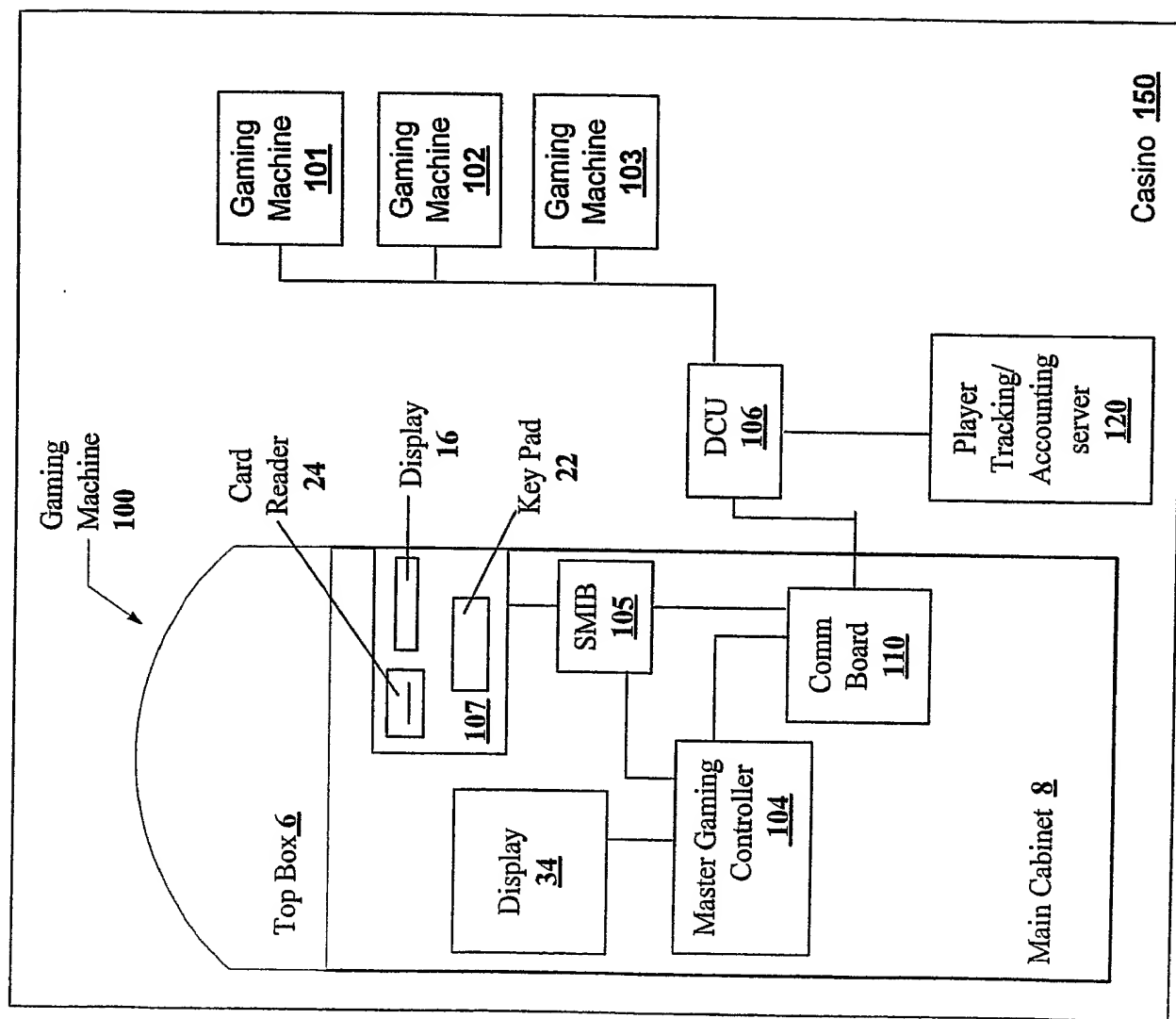
one or more input devices configured to receive selections associated with interfaces displayed on the display;

25 a communication board for communicating with remote gaming devices; and the non-volatile memory for storing the state information.

49. The player tracking unit of claim 48, wherein state information is from a game, a bonus game or a transaction interface generated on the player tracking unit.

30

FIG. 1



PRIOR ART

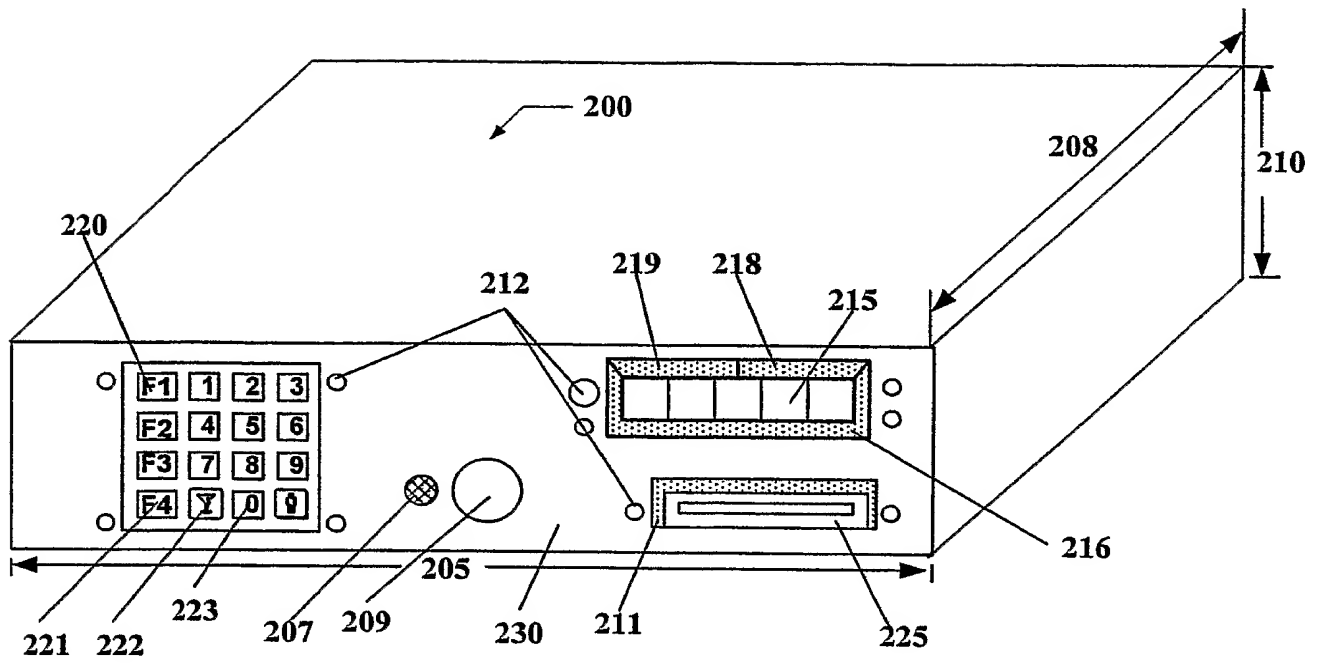


FIG. 2A

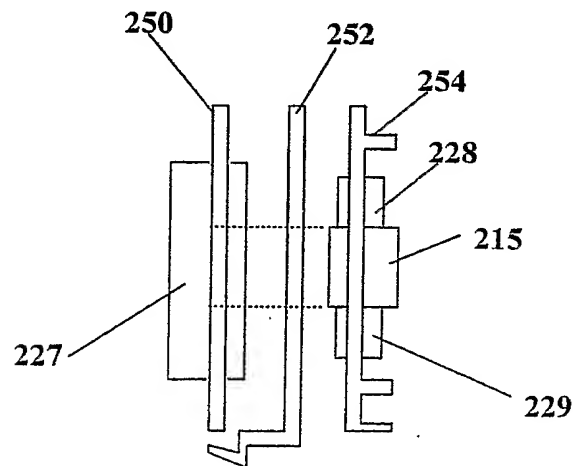


FIG. 2B

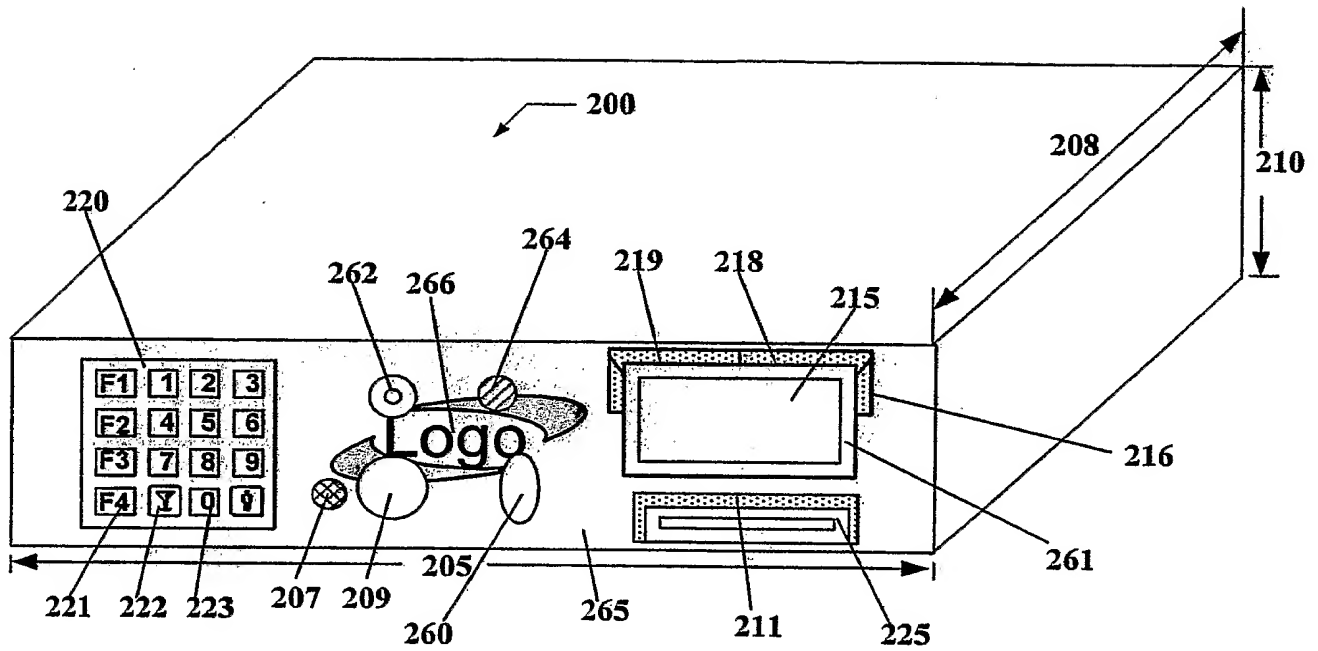


FIG. 2C

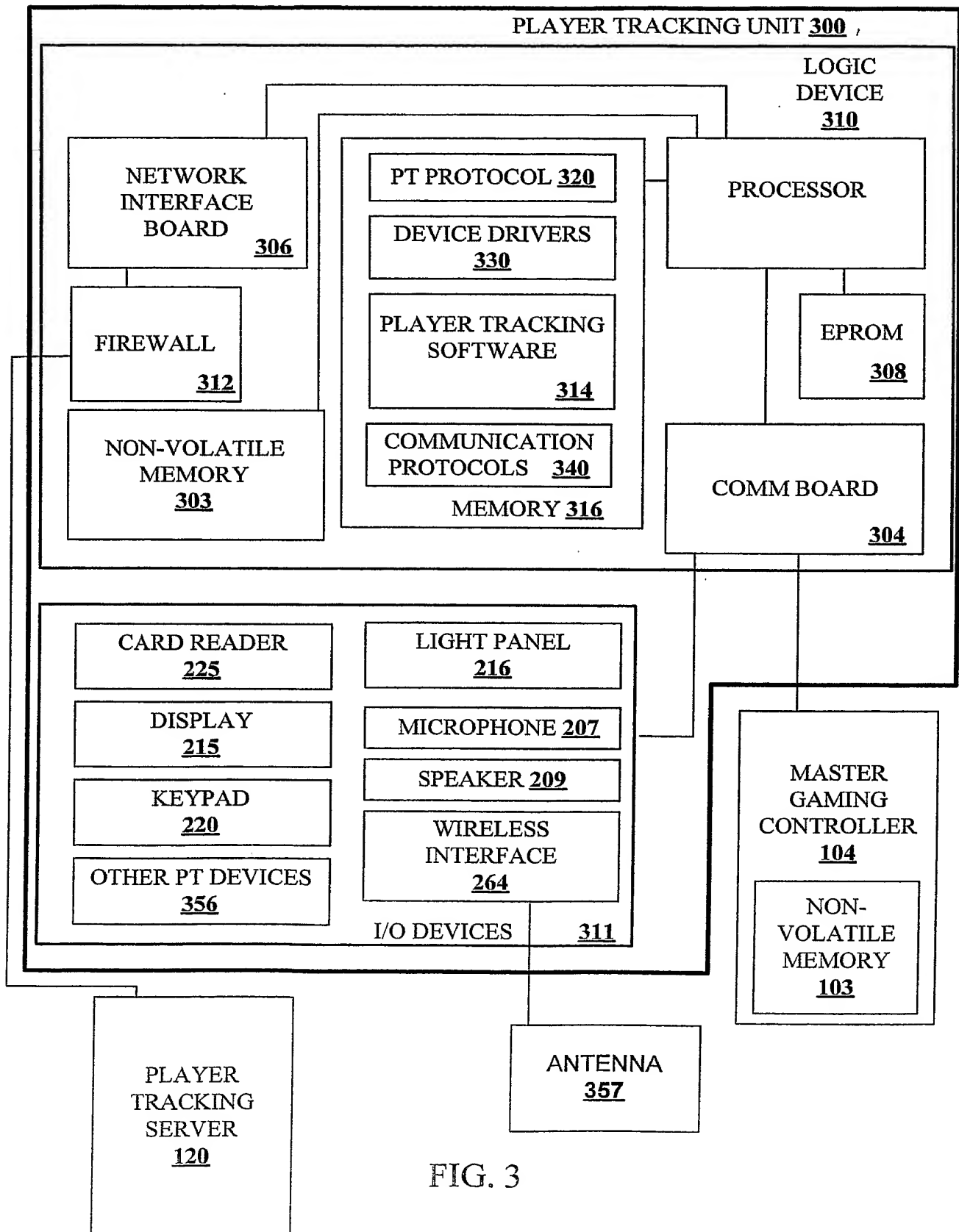
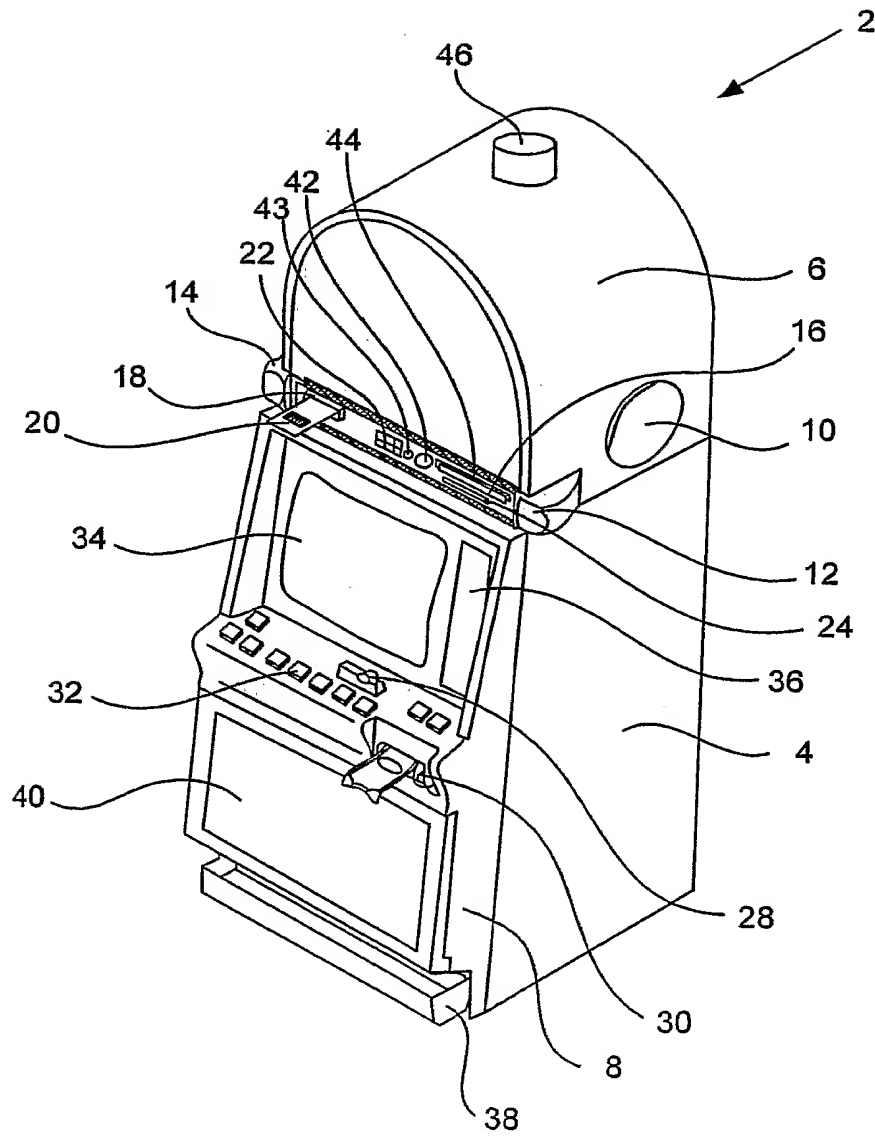


FIG. 3

**Fig. 4**

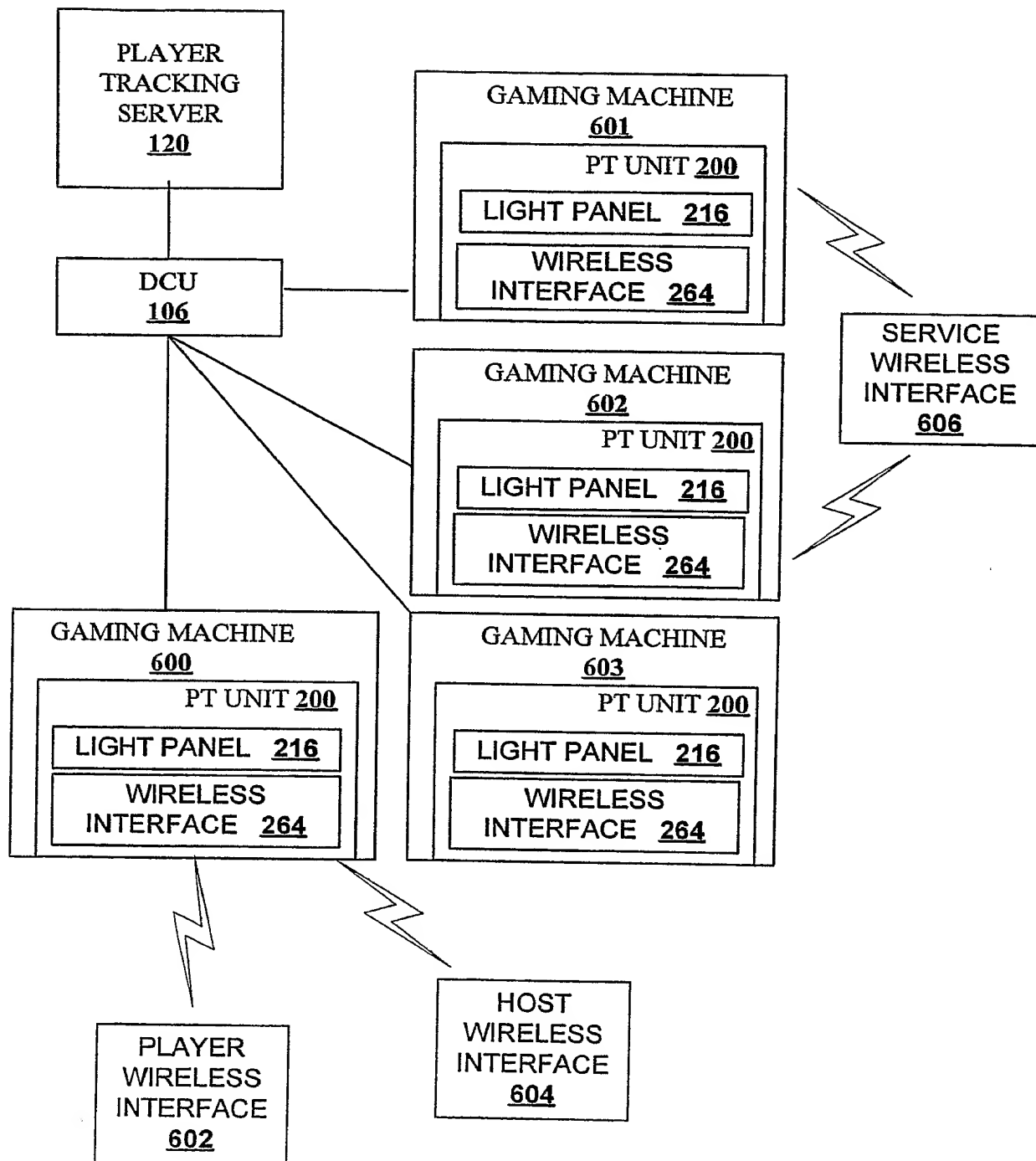


FIG. 5

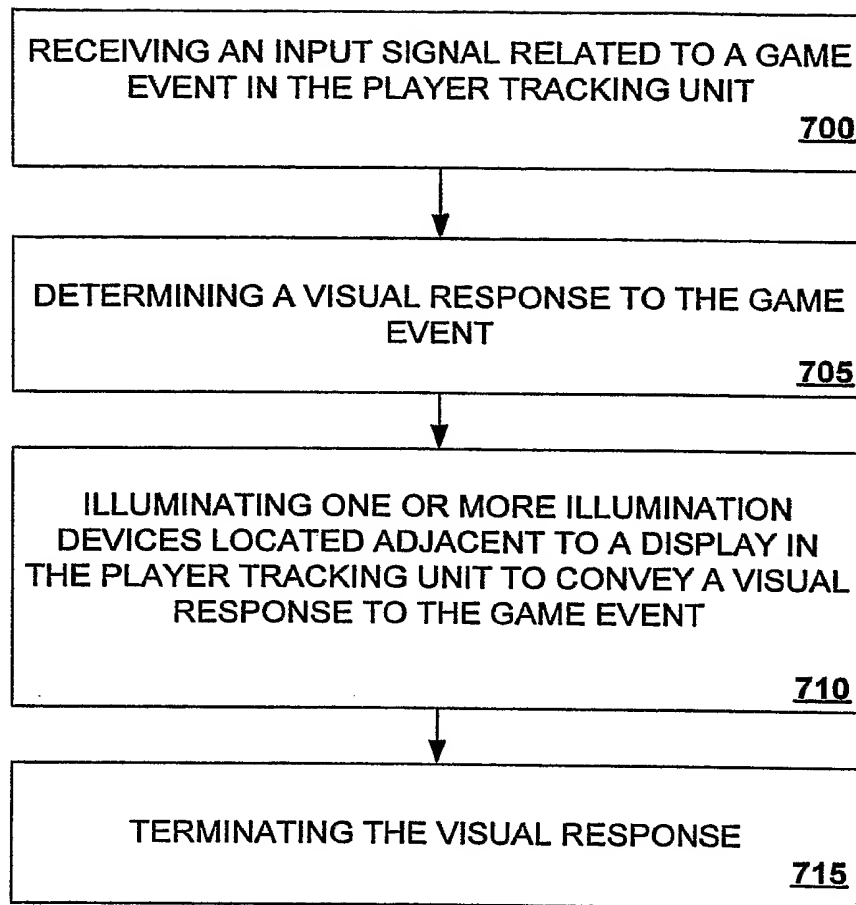
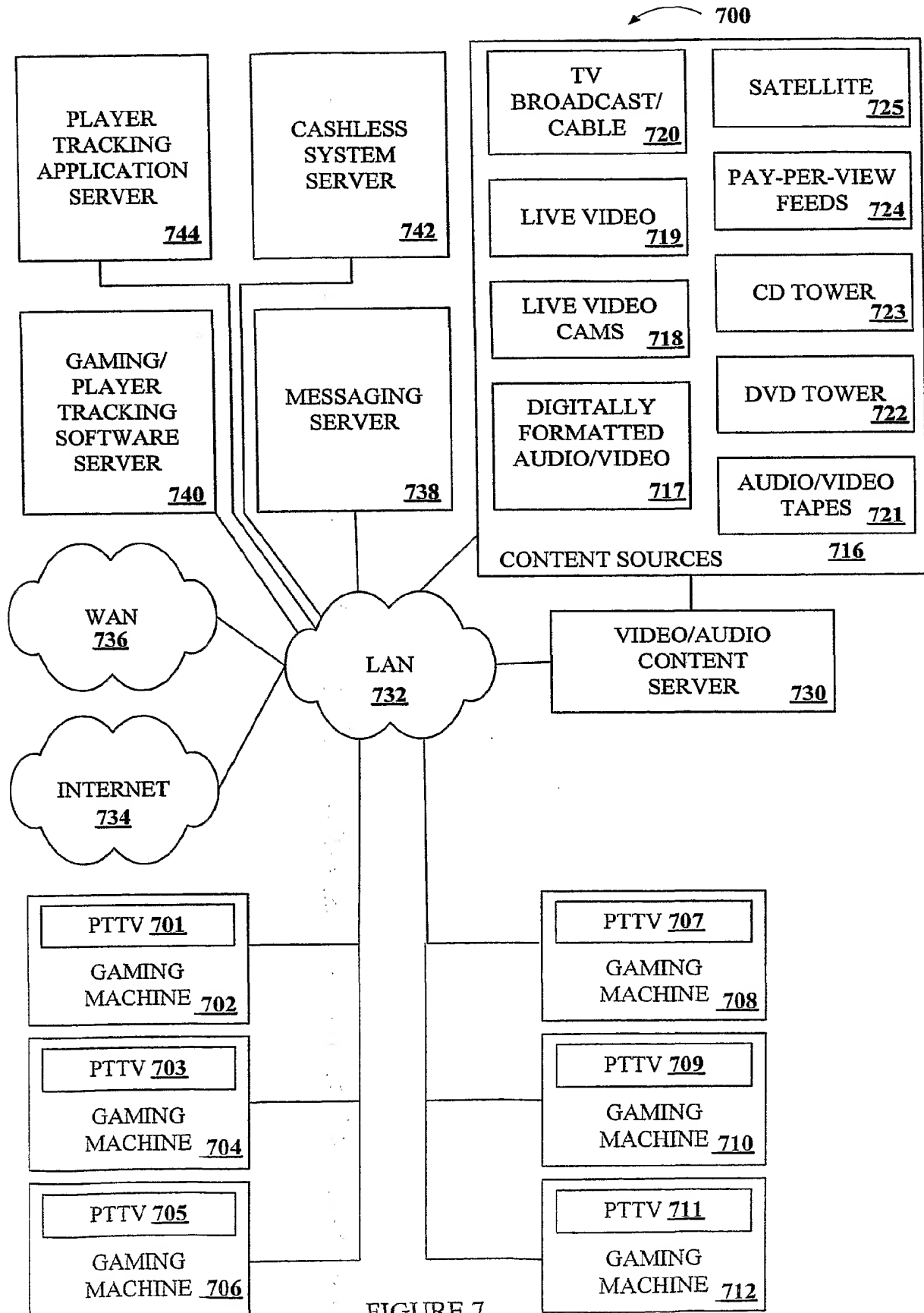


FIG. 6



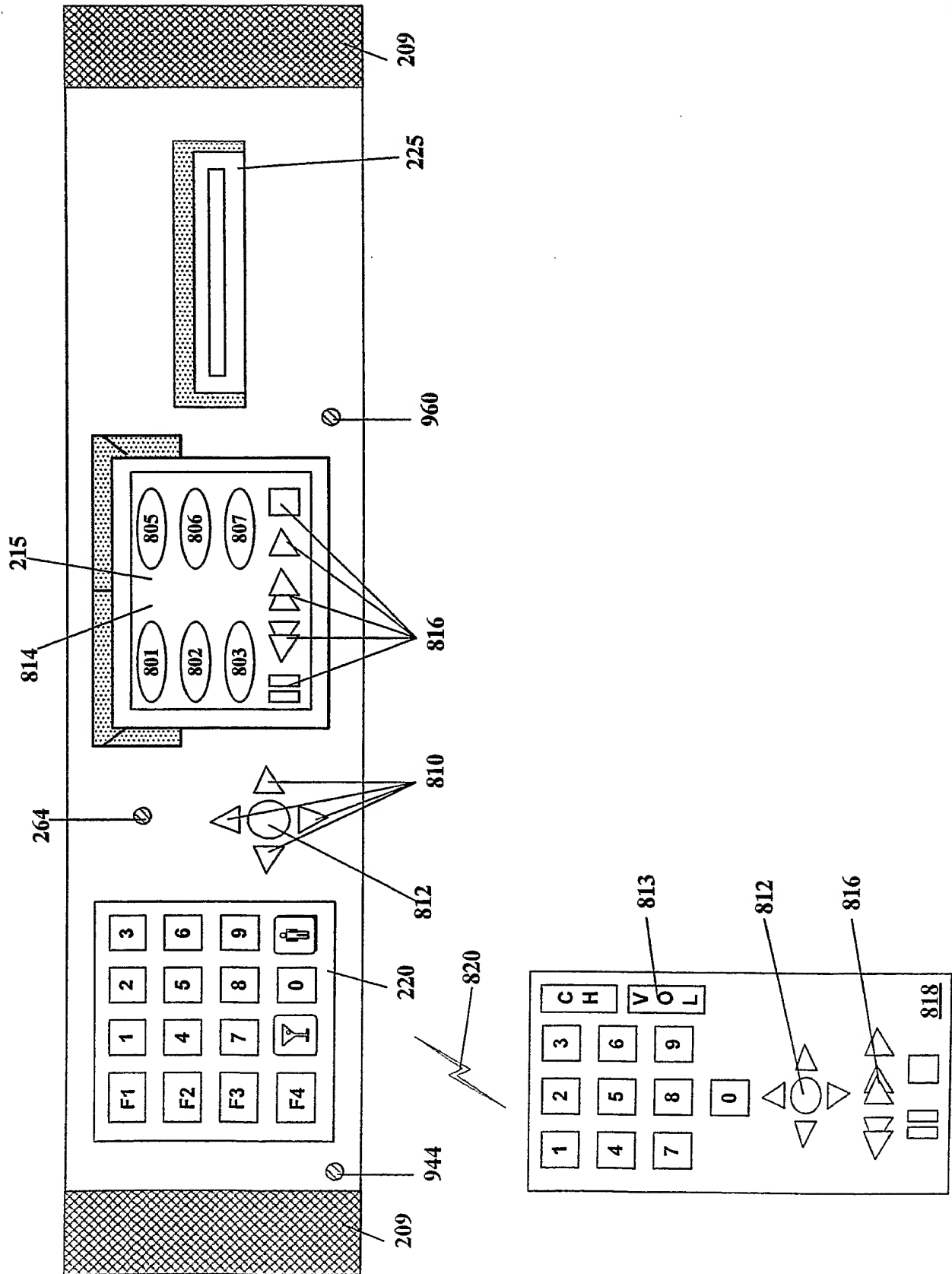


FIGURE 8

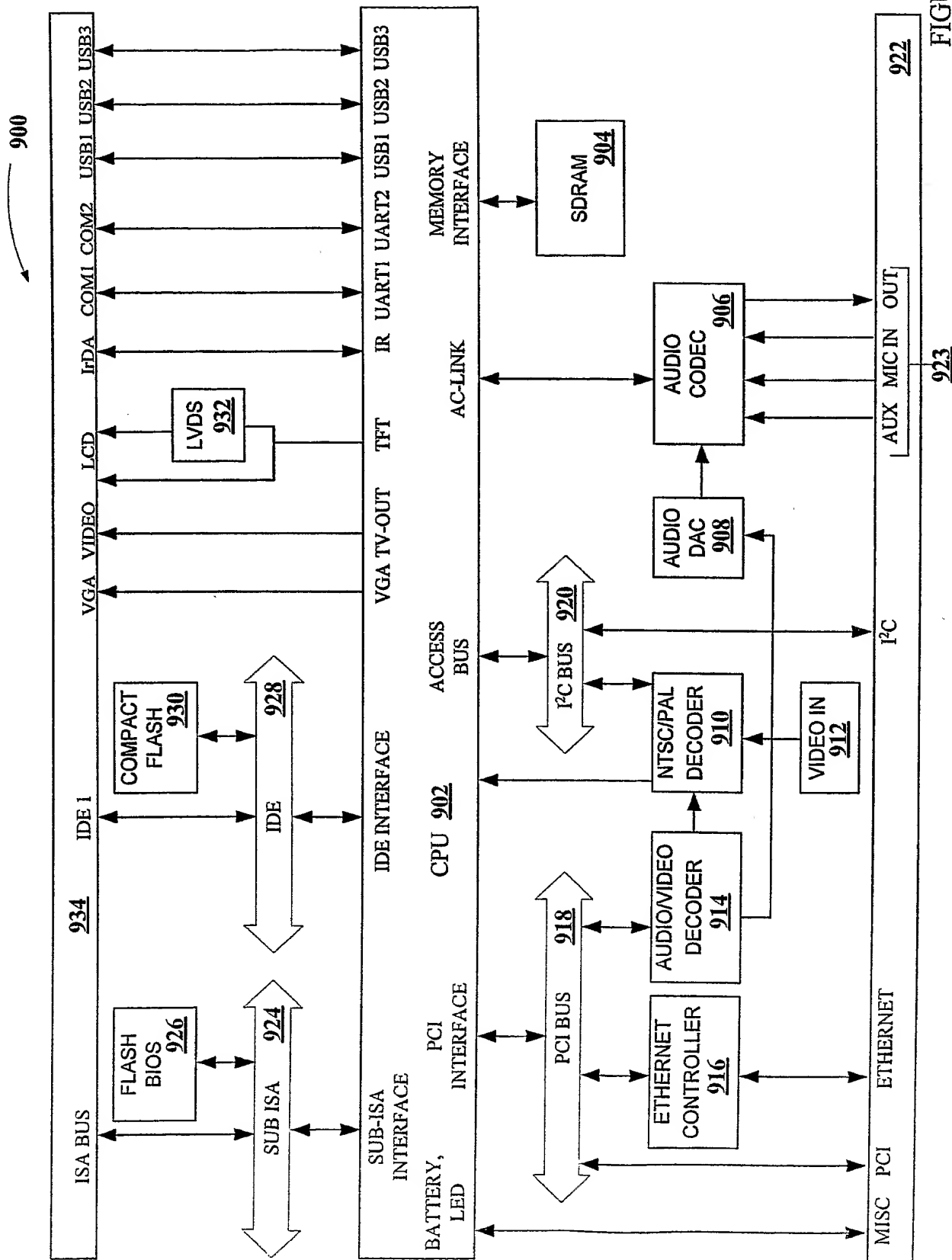


FIGURE 9

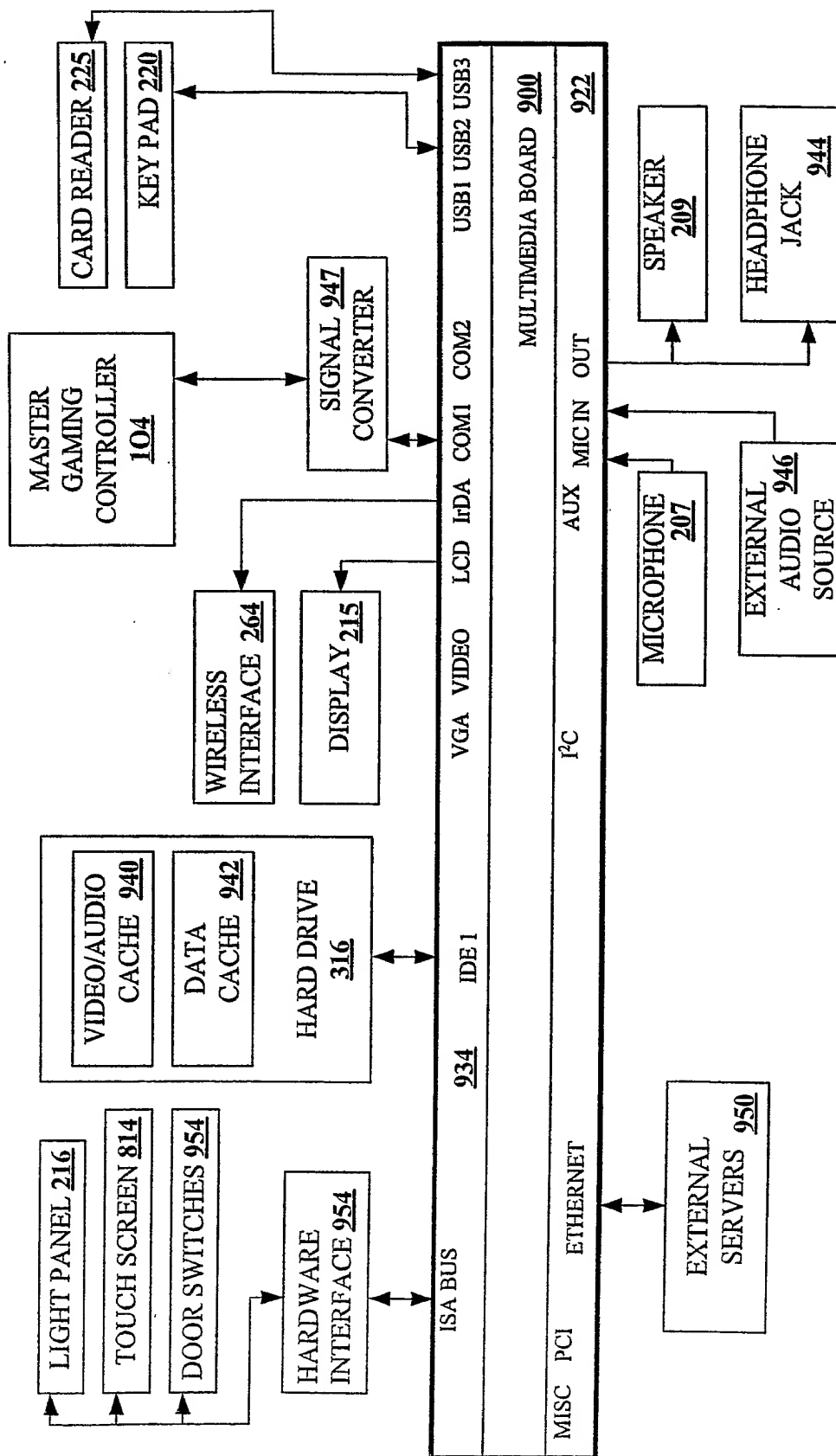


FIGURE 10

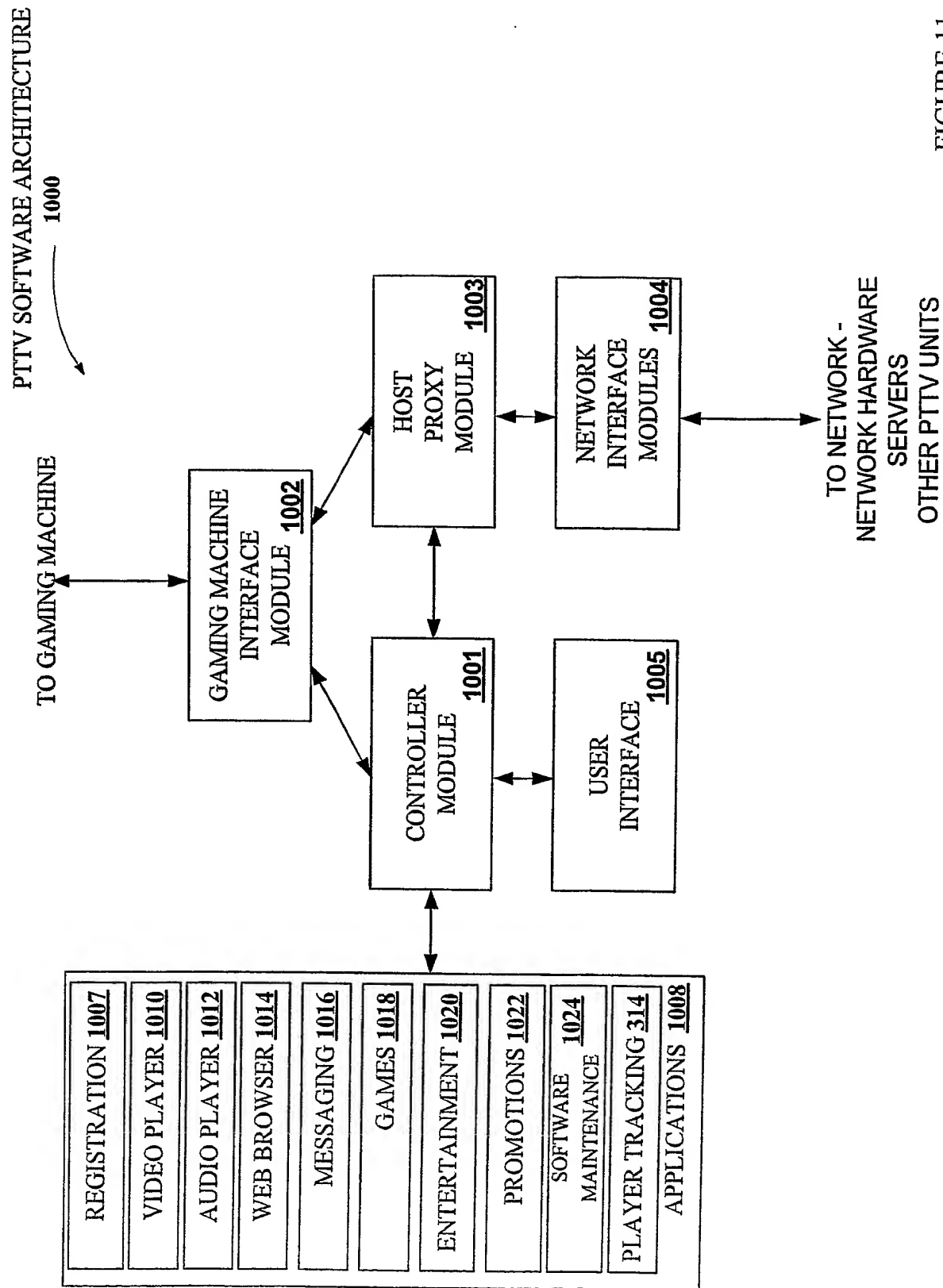


FIGURE 11

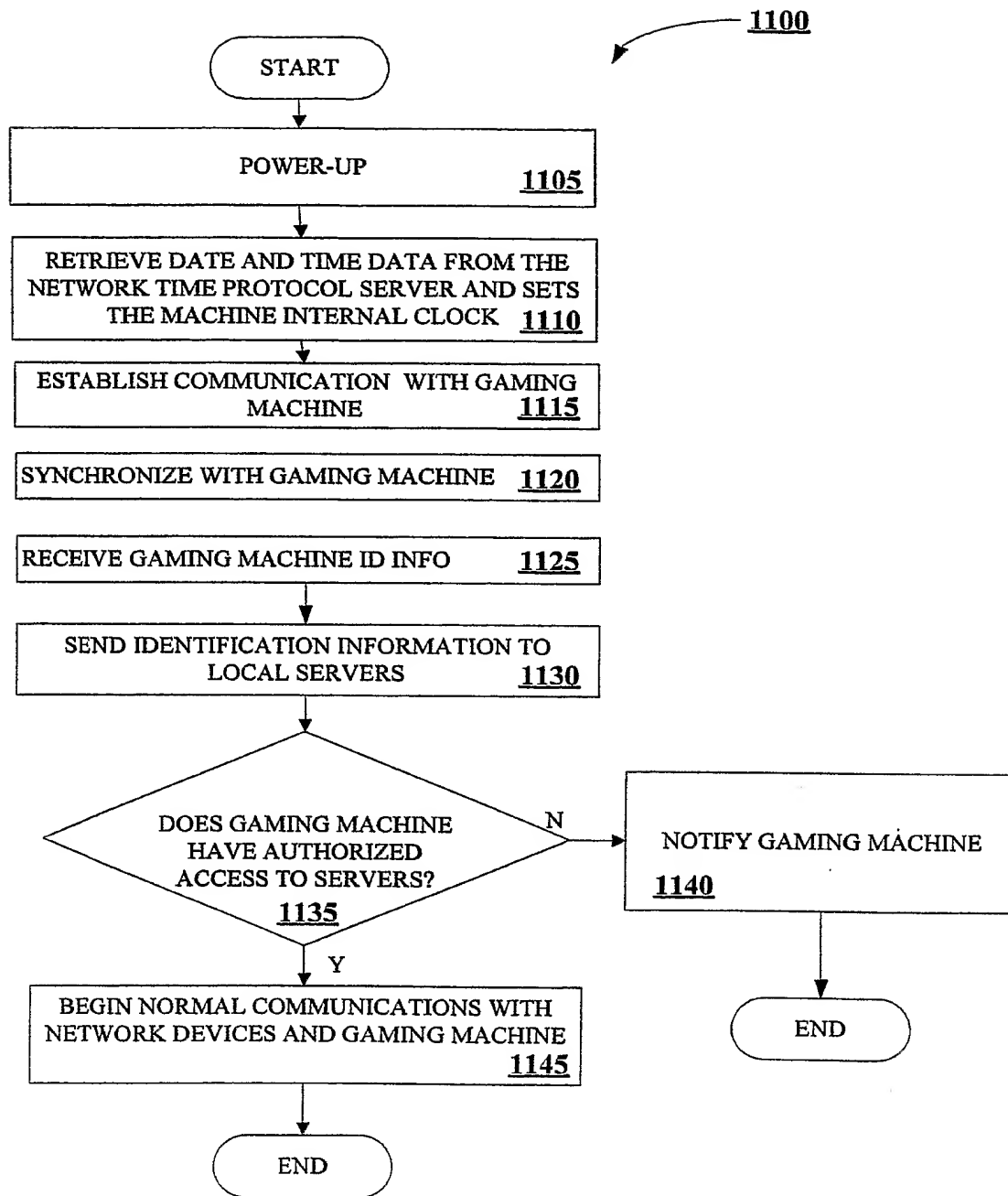


FIGURE 12

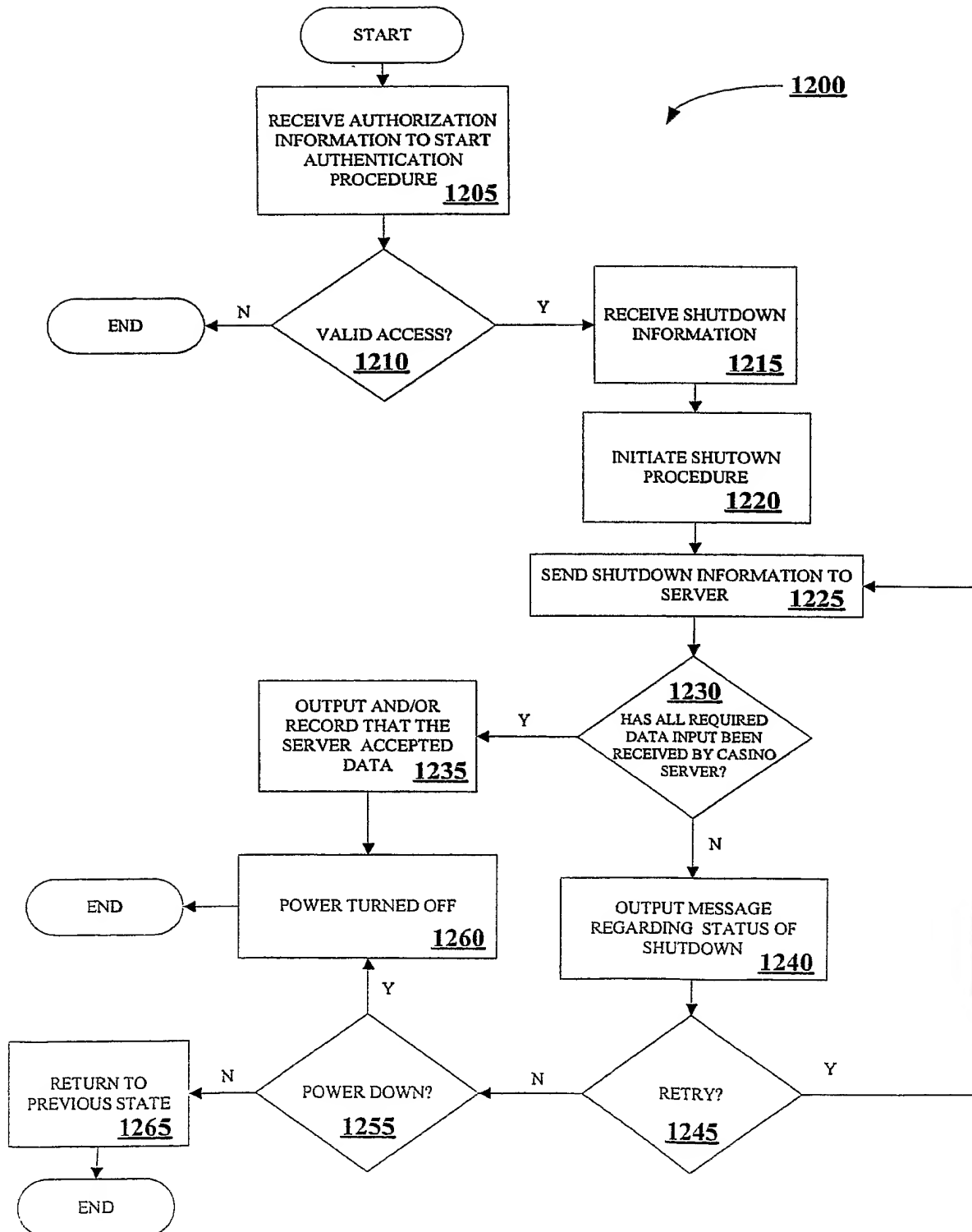


FIGURE 13

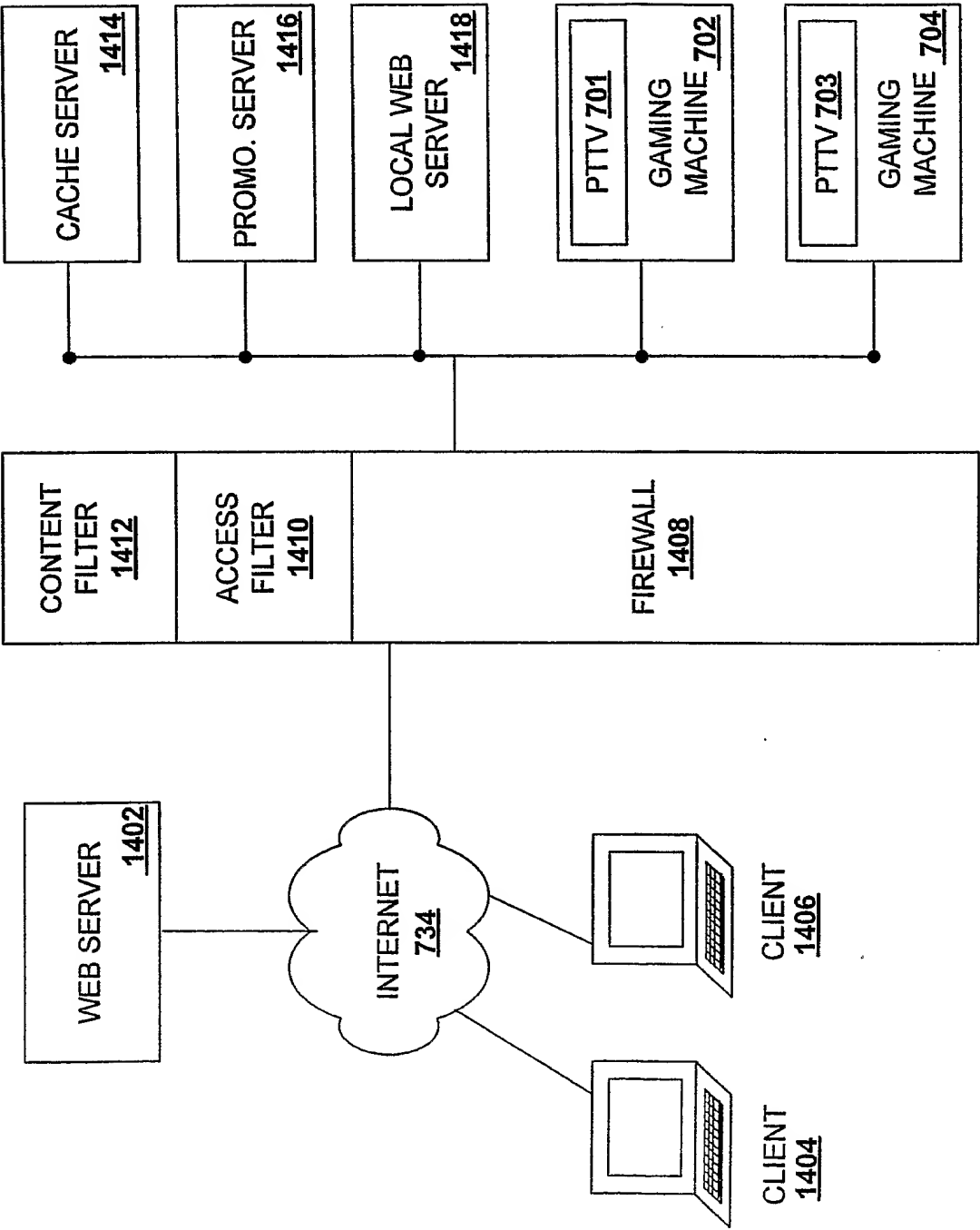


FIGURE 14

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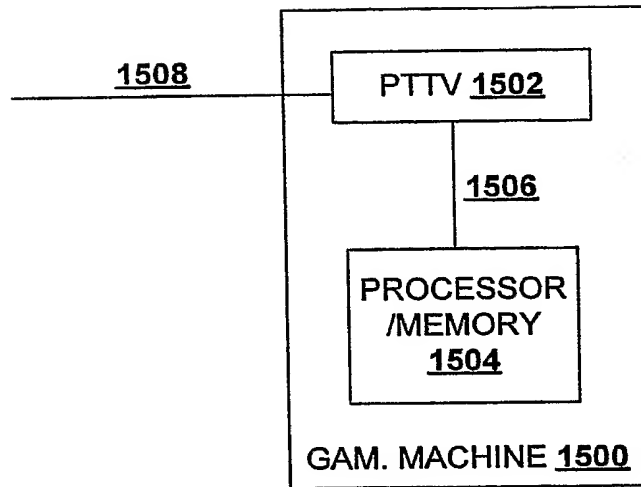


FIGURE 15A

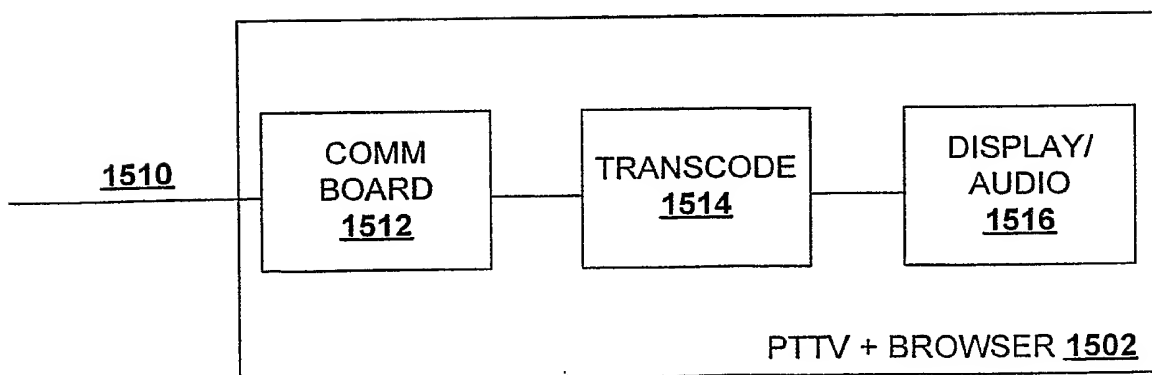


FIGURE 15B